

Service Manual

Direct Drive Turntable System

Model No. **SL-1500CEB**
SL-1500CEG
SL-1500CPP



Product Color: (S)...Silver
(K)...Black (For EB, EG)

WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

IMPORTANT SAFETY NOTICE


There are special components used in this equipment which are important for safety. These parts are marked by  in the Schematic Diagrams, Circuit Board Diagrams, Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire or other hazards. Do not modify the original design without permission of manufacturer.

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1 Safety Precautions

1.1. General Guidelines

1. IMPORTANT SAFETY NOTICE

- There are special components used in this equipment which are important for safety. These parts are marked by \triangle in the Schematic Diagrams, Circuit Board Layout, Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent X-RADIATION, shock, fire, or other hazards. Do not modify the original design without permission of manufacturer.
2. An Isolation Transformer should always be used during the servicing of AC Adaptor whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks. It will also protect AC Adaptor from being damaged by accidental shorting that may occur during servicing.
 3. When servicing, observe the original lead dress. If a short circuit is found, replace all parts which have been overheated or damaged by the short circuit.
 4. After servicing, see to it that all the protective devices such as insulation barriers, insulation papers shields are properly installed.
 5. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.

(This "Safety Precaution" is applied only in U.S.A.)

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

1.1.1. Leakage Current Cold Check

1. Unplug the AC cord and connect a jumper between the two prongs on the plug.
2. Measure the resistance value, with an ohmmeter, between the jumpered AC plug and each exposed metallic cabinet part on the equipment such as screwheads, connectors, control shafts, etc. When the exposed metallic part has a return path to the chassis, the reading should be between $1M\Omega$ and $5.2M\Omega$.

When the exposed metal does not have a return path to the chassis, the reading must be ∞

1.1.2. Leakage Current Hot Check

1. Plug the AC cord directly into the AC outlet. Do not use an isolation transformer for this check.
2. Connect a $1.5k\Omega$, 10 watts resistor, in parallel with a $0.15\mu F$ capacitors, between each exposed metallic part on the set and a good earth ground such as a water pipe, as shown in Figure 1-1.
3. Use an AC voltmeter, with 1000 ohms/volt or more sensitivity, to measure the potential across the resistor.
4. Check each exposed metallic part, and measure the voltage at each point.
5. Reverse the AC plug in the AC outlet and repeat each of the above measurements.
6. The potential at any point should not exceed 0.75 volts RMS. A leakage current tester (Simpson Model 229 or equivalent) may be used to make the hot checks, leakage current must not exceed 1/2 milliamp. In case a measurement is outside of the limits specified, there is a possibility of a shock hazard, and the equipment should be repaired and rechecked before it is returned to the customer.

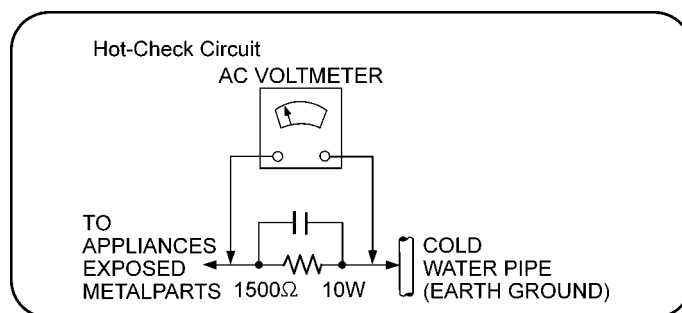


Figure 1-1



1.2. Caution For AC Cord (For EB)

(For the AC mains plug of three pins)

For your safety, please read the following text carefully.

This appliance is supplied with a moulded three pin mains plug for your safety and convenience. A 10-ampere fuse is fitted in this plug.

Should the fuse need to be replaced please ensure that the replacement fuse has a rating of 5-ampere and that it is approved by ASTA or BSI to BS1362.

Check for the ASTA mark  or the BSI mark  on the body of the fuse.

If the plug contains a removable fuse cover you must ensure that it is refitted when the fuse is replaced.

If you lose the fuse cover the plug must not be used until a replacement cover is obtained.

A replacement fuse cover can be purchased from your local dealer.

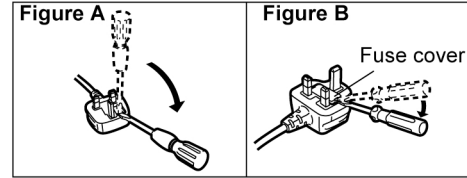
Before use

Remove the connector cover.

How to replace the fuse

The location of the fuse differ according to the type of AC mains plug (figures A and B). Confirm the AC mains plug fitted and follow the instructions below. Illustrations may differ from actual AC mains plug.

1. Open the fuse cover with a screwdriver.



2. Replace the fuse and close or attach the fuse cover.

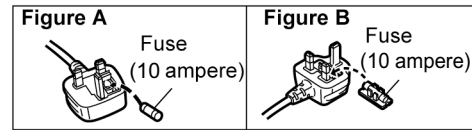















Figure 1-2

1.3. Safety Parts Information

Safety Parts List:

There are special components used in this equipment which are important for safety.

These parts are marked by  in the Schematic Diagrams, Exploded View & Replacement Parts List. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire or other hazards. Do not modify the original design without permission of manufacturer.

Safety	Ref No.	Part No.	Part Name & Description	Remarks
	12	TKFE46501	AC HOLDER	
	28	TZTKF02BE7E	TOP PANEL ASS'Y (BLACK)	EB-K EG-K
	28	TZTKF01BC2E	TOP PANEL ASS'Y (SILVER)	EG-S PP-S EB-S
	30	TZTKF01BE7E	BOTTOM CABINET ASS'Y	EB-K EG-K EG-S EB-S
	30	TZTKF01AH8U	BOTTOM CABINET ASS'Y	PP-S
	A1	K2CT3YY00096	AC CORD	EB-K EB-S
	A1	K2CG3YY00219	AC CORD	PP-S
	A1	K2CM3YY00055	AC CORD	EG-S EG-K
	A2	TQBM0414	OI (En)	EB-K EB-S
	A2	TQBM0413	OI (En/Ge/Fr/It/Sp/Da/Du/Sw/Fi/Po)	EG-K EG-S
	A2	TQBM0415	OI (En/Cf)	PP-S
	PCB4	TNPA7015AB	SMPS P.C.B.	

2 Warning

2.1. Prevention of Electrostatic Discharge (ESD) to Electrostatically Sensitive (ES) Devices

Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices.

Examples of typical ES devices are IC (integrated circuits) and some field-effect transistors and semiconductor "chip" components.

The following techniques should be used to help reduce the incidence of component damage caused by electrostatic discharge (ESD).


1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any ESD on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging ESD wrist strap, which should be removed for potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static solder removal device. Some solder removal devices not classified as "anti-static (ESD protected)" can generate electrical charge sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.

CAUTION:

Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity (ESD) sufficient to damage an ES device).

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2.2. General description about Lead Free Solder (PbF)

The lead free solder has been used in the mounting process of all electrical components on the printed circuit boards used for this equipment in considering the globally environmental conservation.

The normal solder is the alloy of tin (Sn) and lead (Pb). On the other hand, the lead free solder is the alloy mainly consists of tin (Sn), silver (Ag) and Copper (Cu), and the melting point of the lead free solder is higher approx.30 degrees C (86°F) more than that of the normal solder.

Definition of PCB Lead Free Solder being used

The letter of "PbF" is printed either foil side or components side on the PCB using the lead free solder.

(See right figure)

PbF

Service caution for repair work using Lead Free Solder (PbF)

- The lead free solder has to be used when repairing the equipment for which the lead free solder is used.
(Definition: The letter of "PbF" is printed on the PCB using the lead free solder.)
- To put lead free solder, it should be well molten and mixed with the original lead free solder.
- Remove the remaining lead free solder on the PCB cleanly for soldering of the new IC.
- Since the melting point of the lead free solder is higher than that of the normal lead solder, it takes the longer time to melt the lead free solder.
- Use the soldering iron (more than 70W) equipped with the temperature control after setting the temperature at 350±30 degrees C (662±86°F).

Recommended Lead Free Solder (Service Parts Route.)

- The following 3 types of lead free solder are available through the service parts route.
RFKZ03D01K----- (0.3mm 100g Reel)
RFKZ06D01K----- (0.6mm 100g Reel)
RFKZ10D01K----- (1.0mm 100g Reel)

Note

* Ingredient: tin (Sn), 96.5%, silver (Ag) 3.0%, Copper (Cu) 0.5%, Cobalt (Co) / Germanium (Ge) 0.1 to 0.3%

2.2.1. Precautions for servicing

■ Note for assembly and disassembly

- When turning the unit over, be sure to close the dust cover or put a cardboard as a base, and place the unit on a soft thick cloth or cushion, etc, to prevent cracking.
- When removing the DC motors and tone arm unit, be sure to attach a soft cloth inside the dust cover beforehand to prevent cracking.

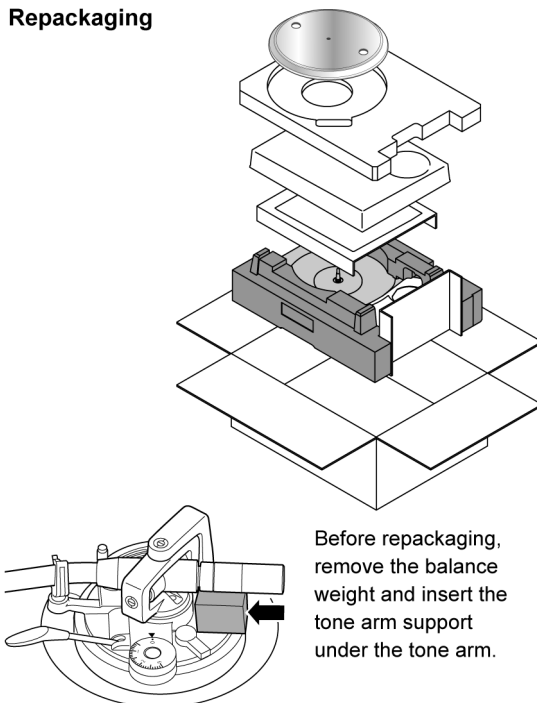
■ Note when moving the unit

Repackage the unit in the packaging it came in.

If you no longer have the packaging, do the following:

- Take off the turntable and turntable mat and carefully wrap them.
- Remove the head shell and balance weight from the tone arm and carefully wrap them.
- Clamp the tone arm with the arm clamp and tape it in place.
- Carefully wrap the main unit in a blanket or paper.

Repackaging



3 Specifications

■ General

Power supply	AC 110 V to 240 V, 50/60 Hz (EB/EG) AC 120 V, 60 Hz (PP)
Power consumption	8.0 W (Power ON) Approx 0.2 W (Power OFF)
Dimensions (W x H x D)	453 mm x 169 mm x 372 mm (17 - $\frac{27}{32}$ " x 6 - $\frac{21}{32}$ " x 14 - $\frac{21}{32}$ " inch)
Mass	Approx 9.9 kg (21.9 lbs)
Operating temperature range	0 °C to +40 °C
Operating humidity range	35% to 80% RH (no condensation)

■ Turntable section

Drive method	Direct drive
Motor	Brushless DC motor
Turntable platter	Aluminum diecast Diameter: 332 mm (13 - $\frac{5}{64}$ " Weight: About 2.0 kg (4.5 lbs) (including rubber sheet)
Turntable speeds	33 - $\frac{1}{3}$ rpm, 45 rpm, 78 rpm
Starting torque	0.18 N•m 1.8 kg•cm) (1.56 lbs-in)
Build-up characteristics	0.7 s. from standstill to 33 - $\frac{1}{3}$ rpm
Braking system	Electronic brake
Wow and flutter	0.025% W.R.M.S.

■ Tone arm section

Type	Static Balance
Effective length	230 mm (9 - $\frac{1}{16}$ "
Overhang	15 mm ($\frac{19}{32}$ "
Tracking error angle	Within 2° 32' (at the outer groove of 30 cm (12") record) Within 0° 32' (at the inner groove of 30 cm (12") record)
Offset angle	22°
Arm-height adjustment range	0 – 6 mm (0 - $\frac{15}{64}$ "
Stylus pressure adjustment range	0 – 4 g (direct reading)
Head shell weight	Approx. 7.6 g
Applicable cartridge weight range	(Without the auxiliary weight) 5.6 – 12.0 g 14.3 – 20.7 g (including the head shell) (With the small auxiliary weight) 10.0 – 16.4 g 18.7 – 25.1 g (including the head shell)
Shell terminal	Ø1.2 mm 4 pin terminal

■ Phono equalizer section

Gain	37 dB
------	-------

■ Cartridge section

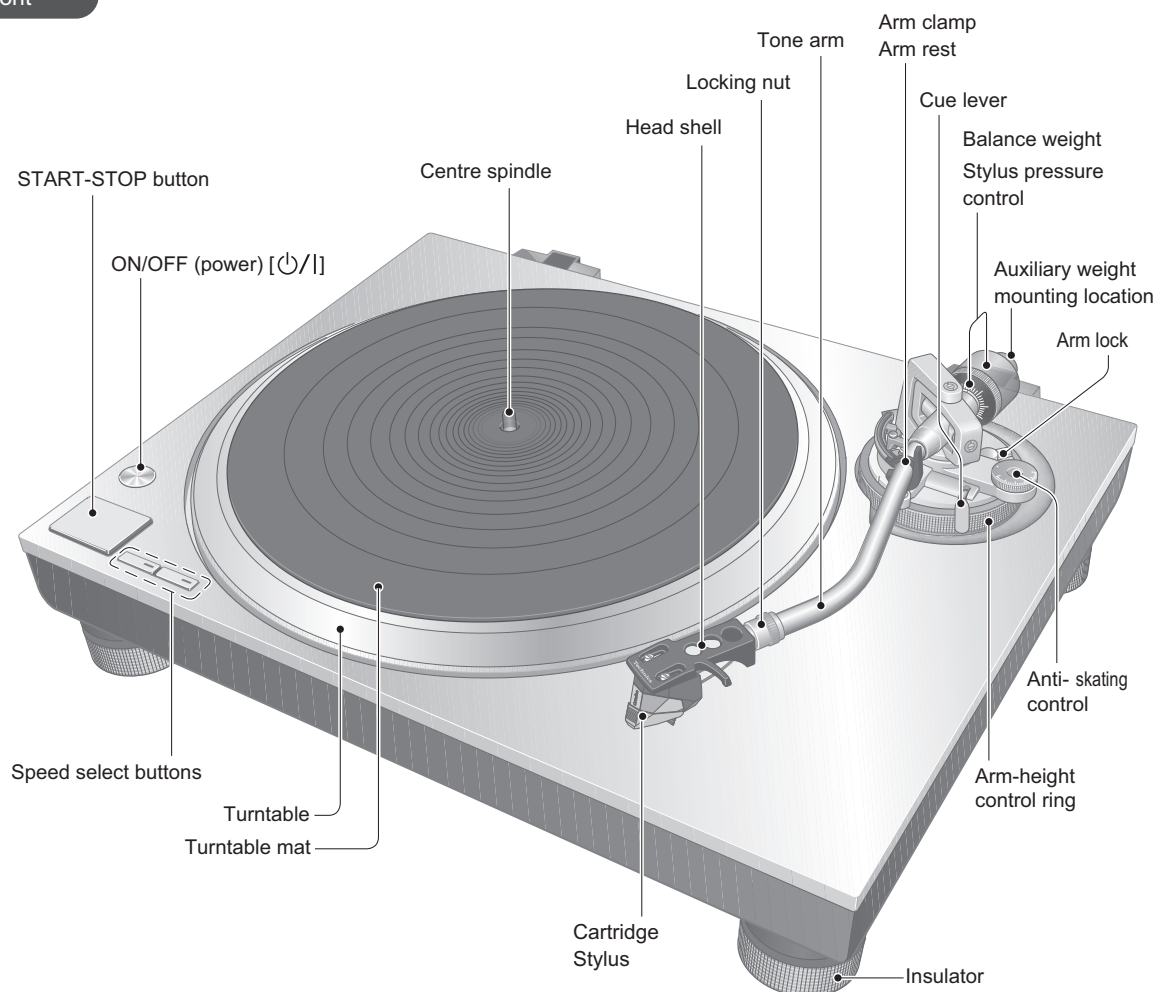
Type	MM type
Output voltage	5.5 mV
Mass	7.2 g
Stylus pressure	1.8 g

Note:

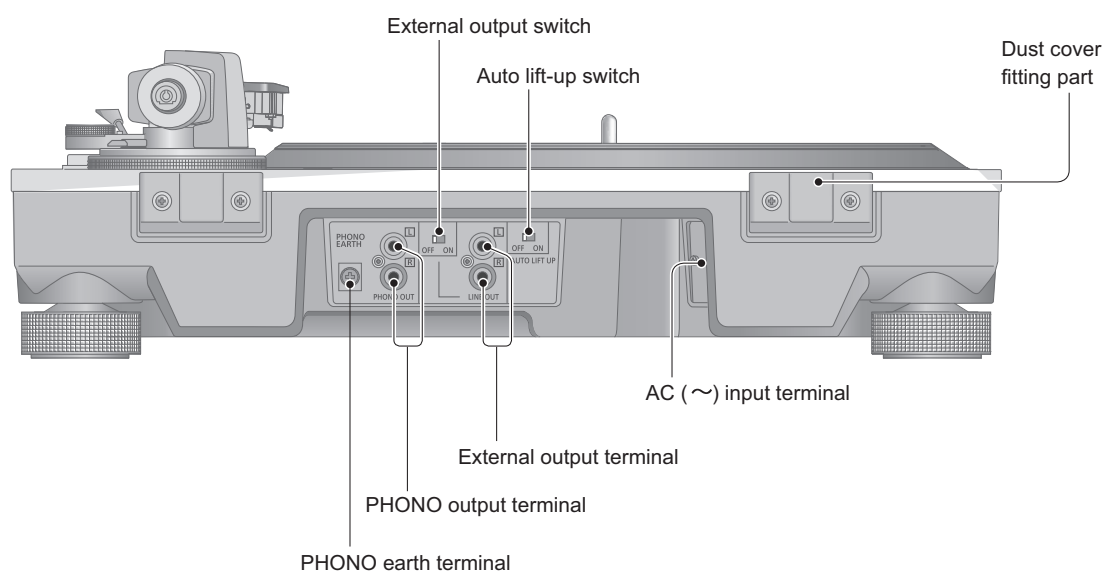
Specifications are subject to change without notice.

4 Location of Controls and Components

Front

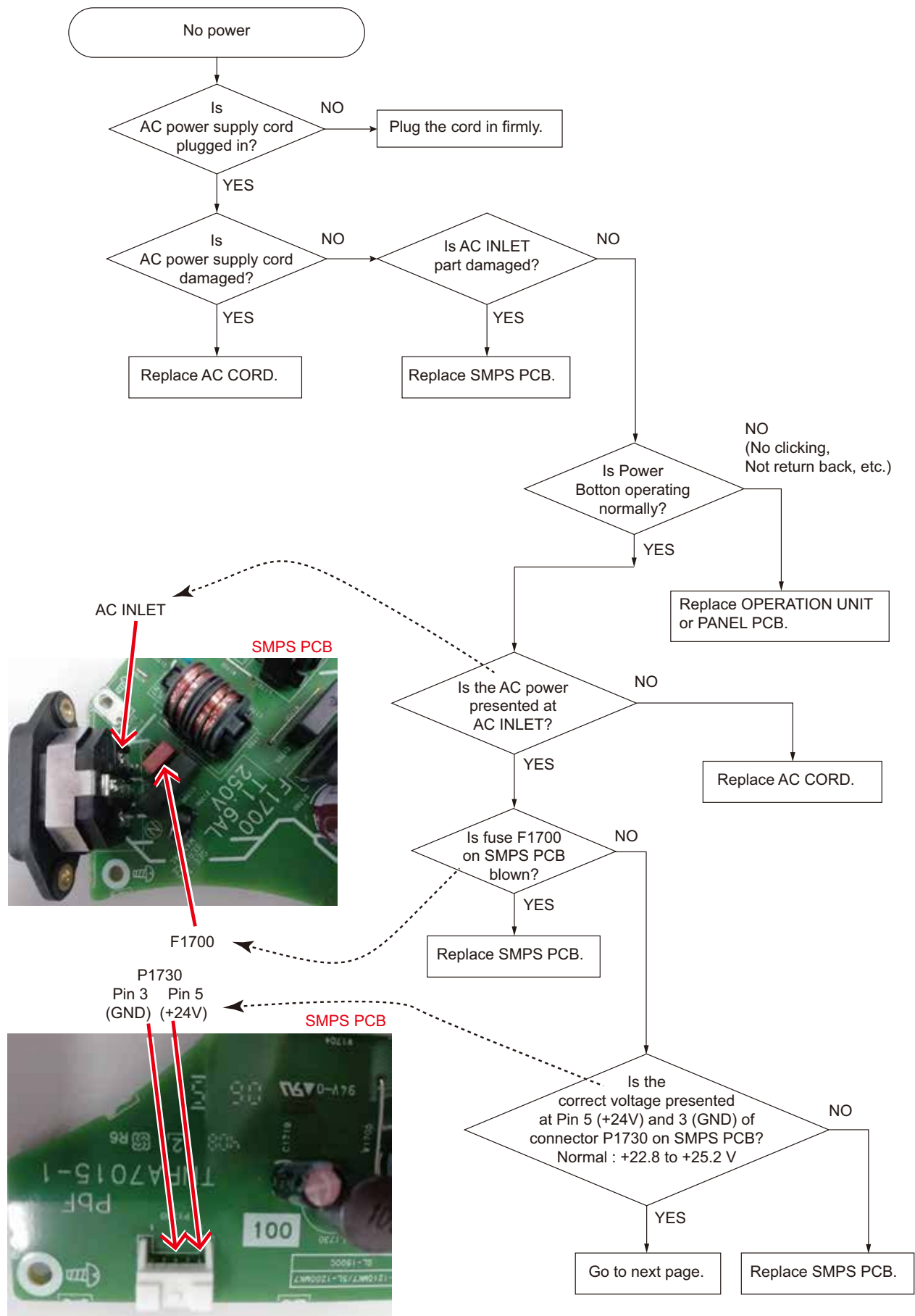


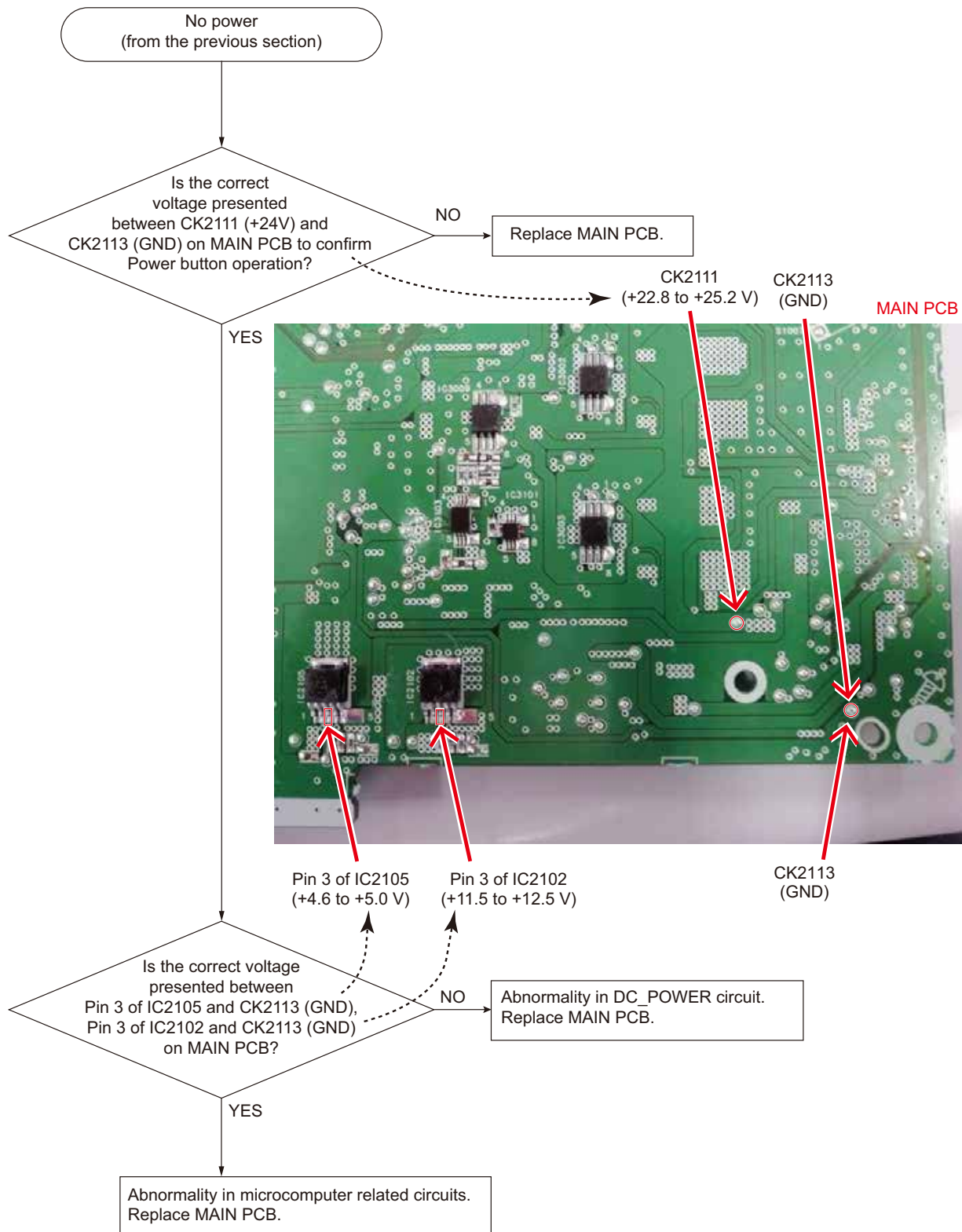
Back



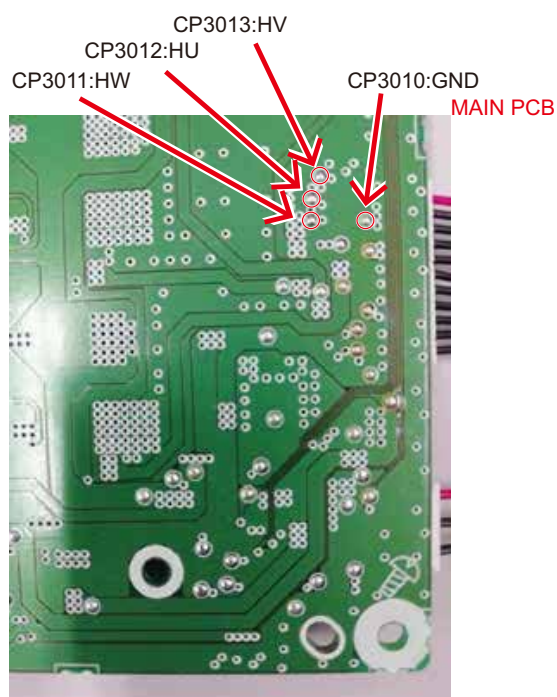
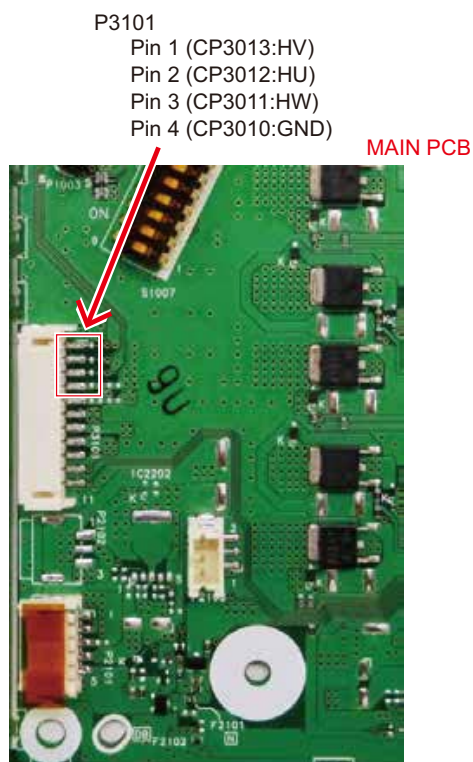
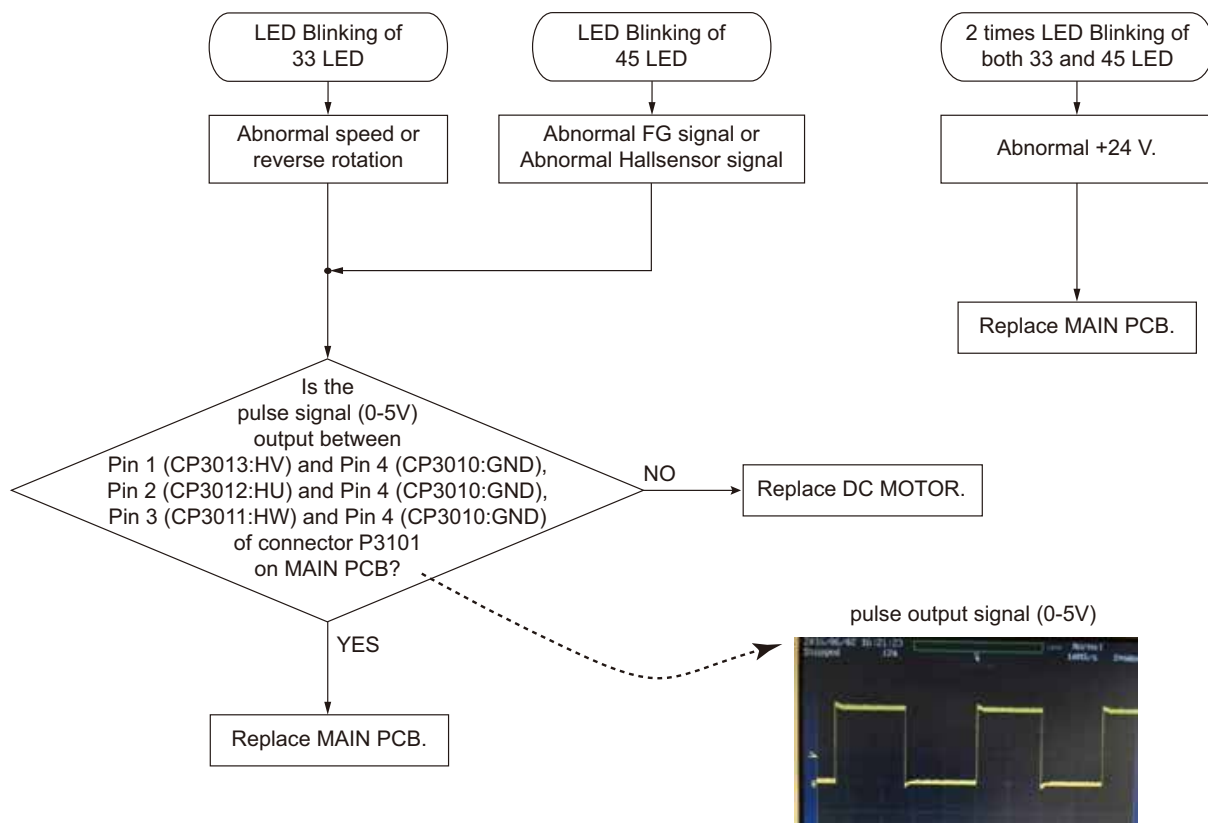
5 Troubleshooting Guide

5.1. No Power



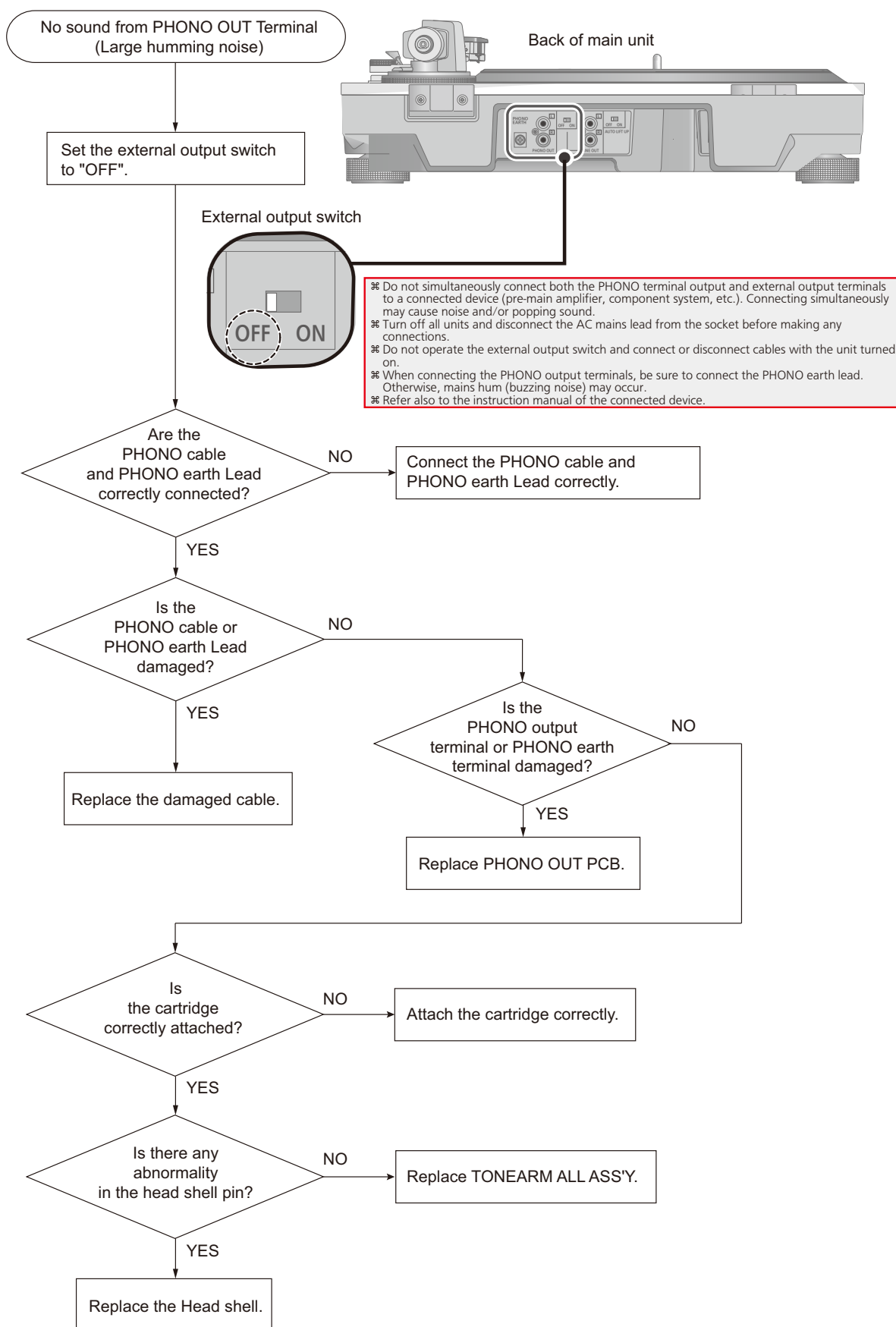


5.2. LED Blinking

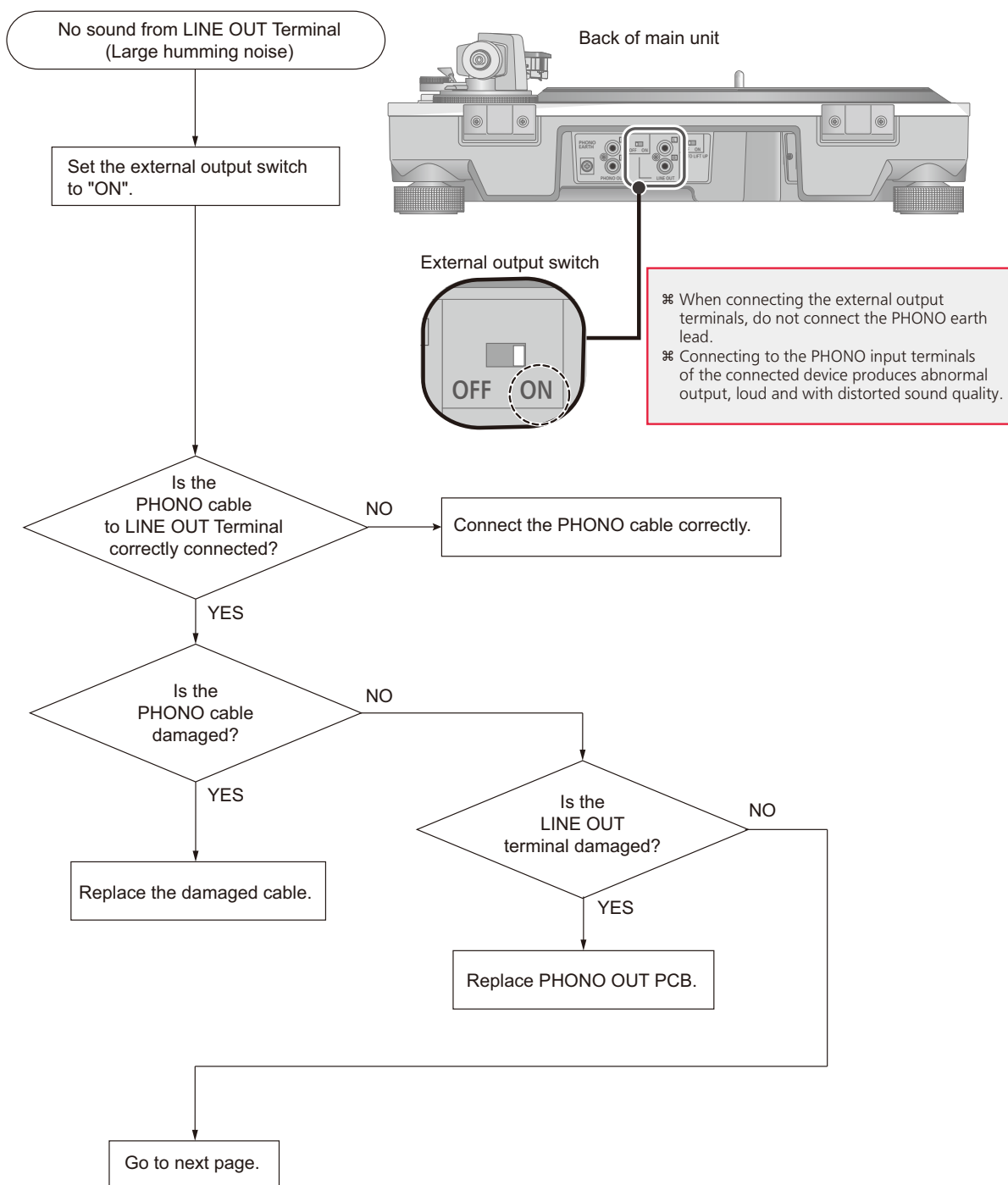


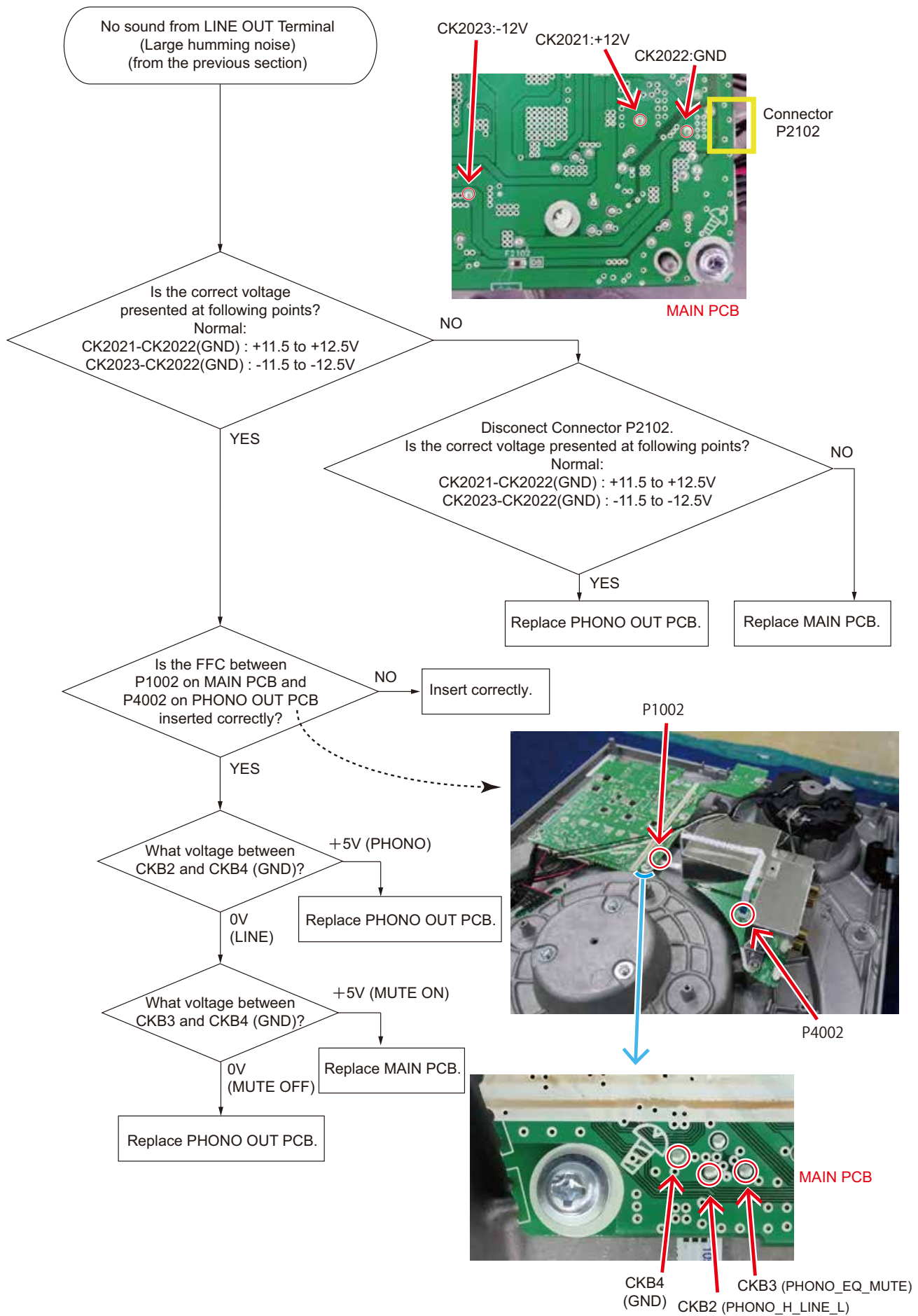
5.3. No sound (Large humming noise)

5.3.1. No sound from PHONO OUT Terminal

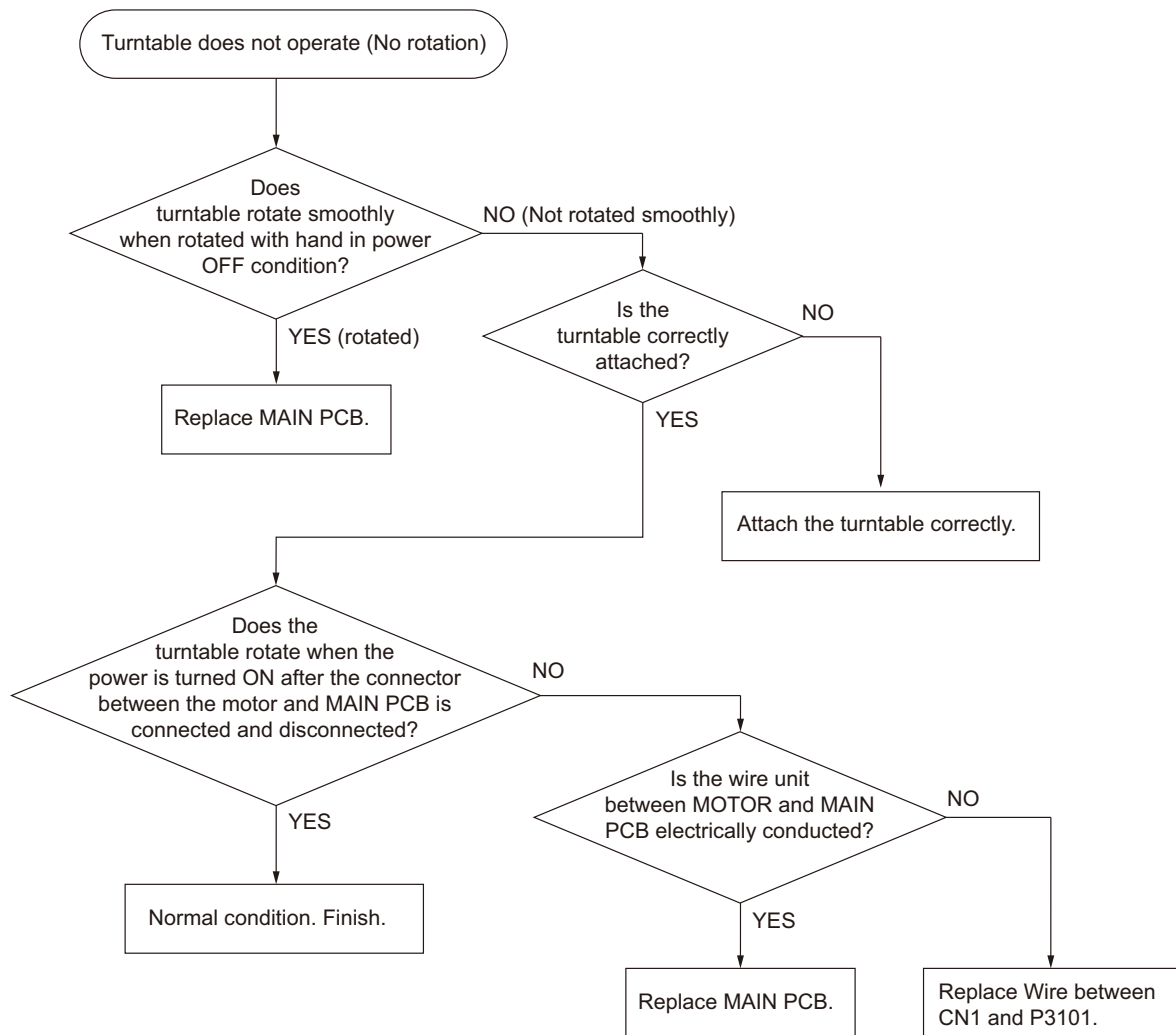


5.3.2. No sound from LINE OUT Terminal



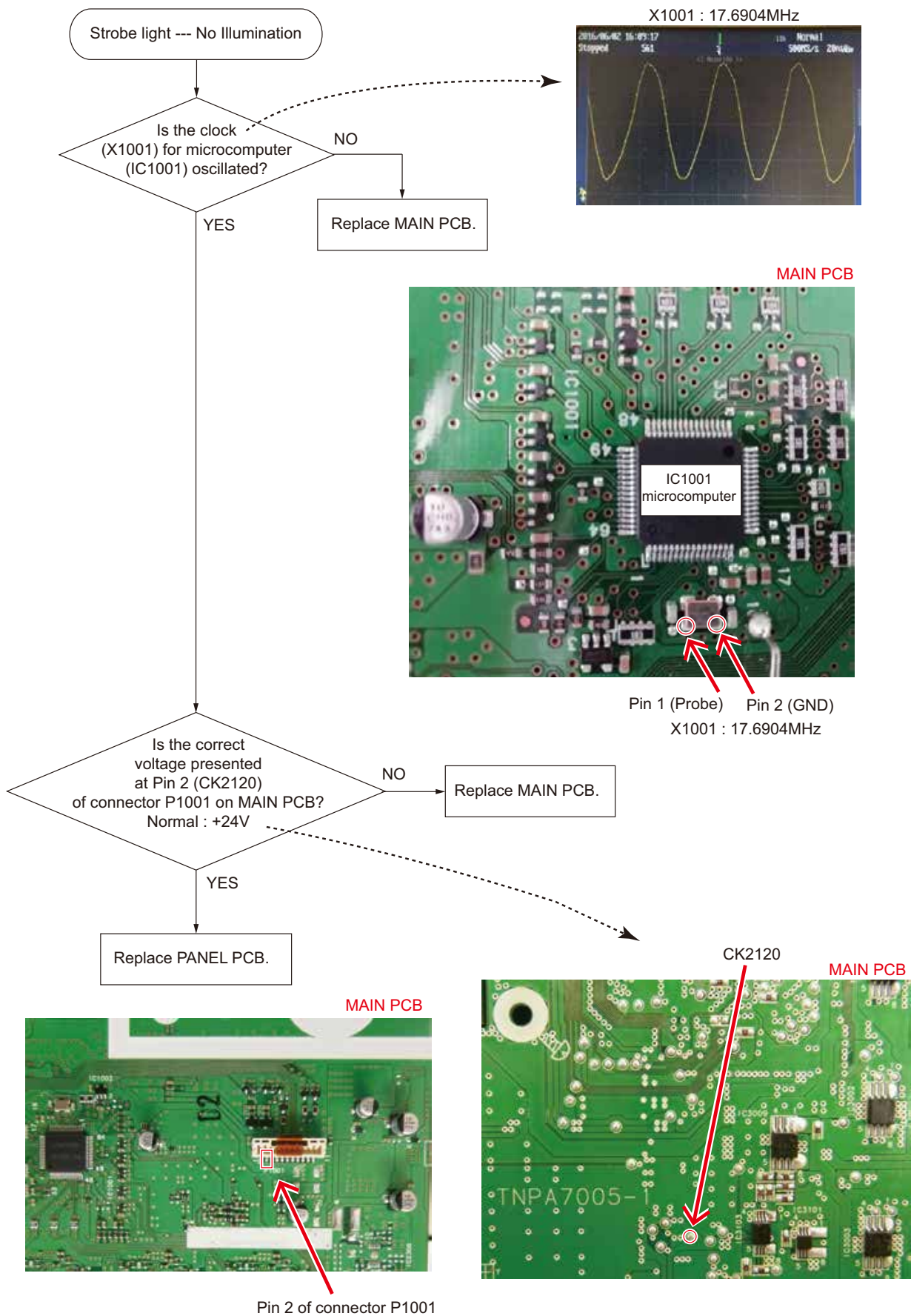


5.4. Turntable Does Not Operate (No rotation)

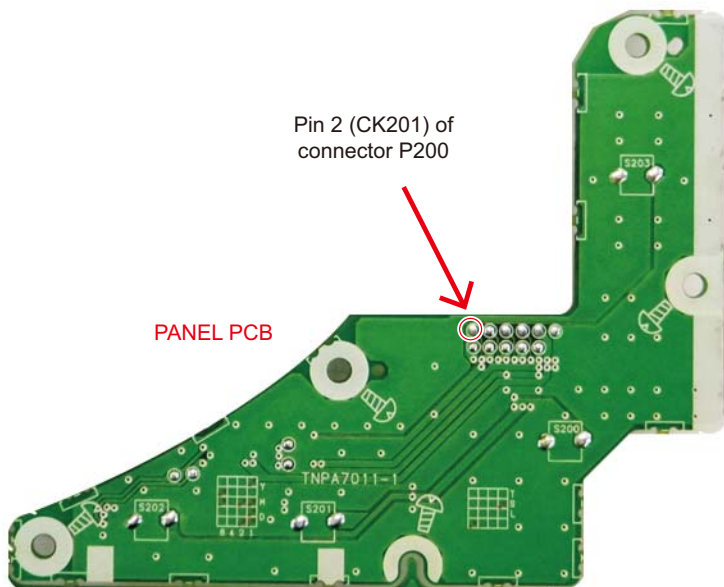
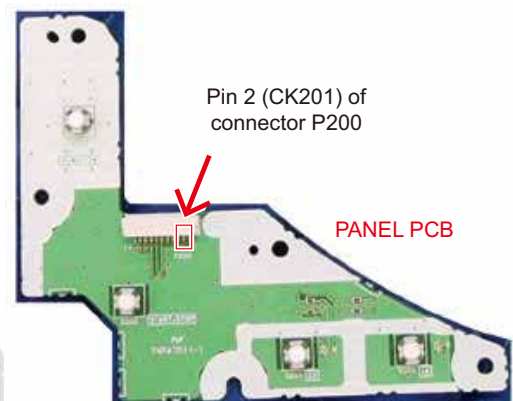
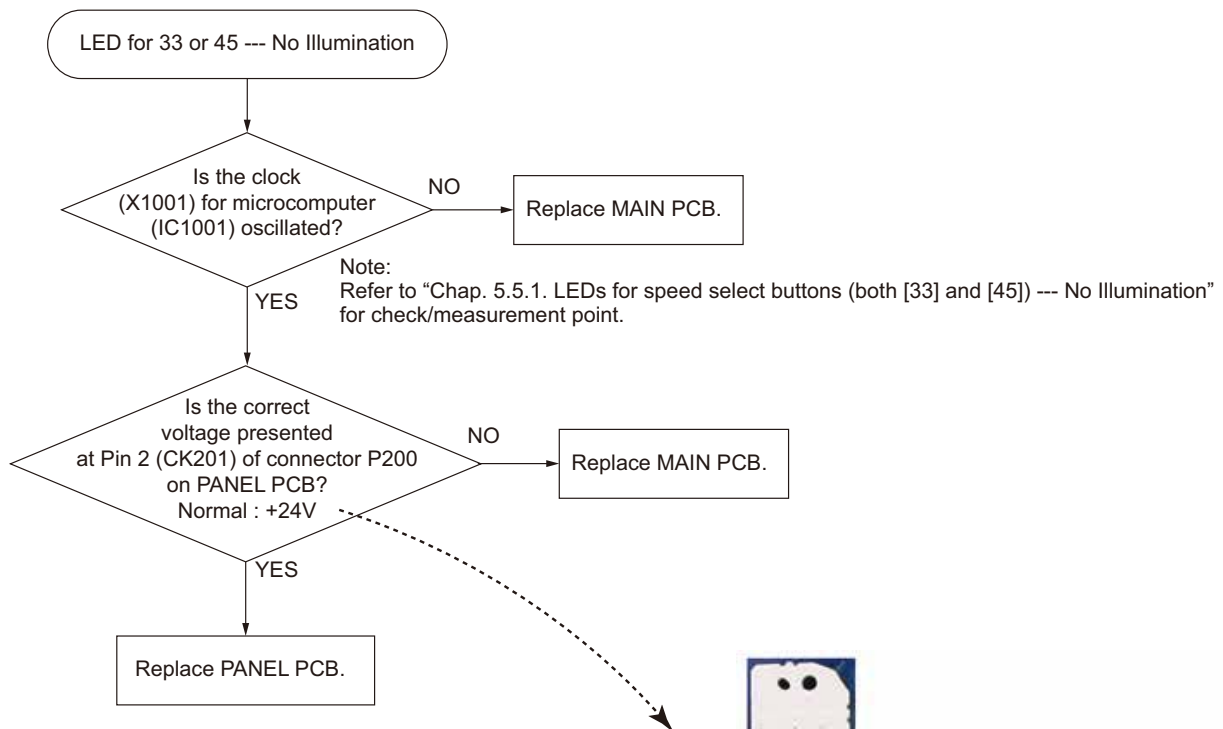


5.5. LED No Illumination

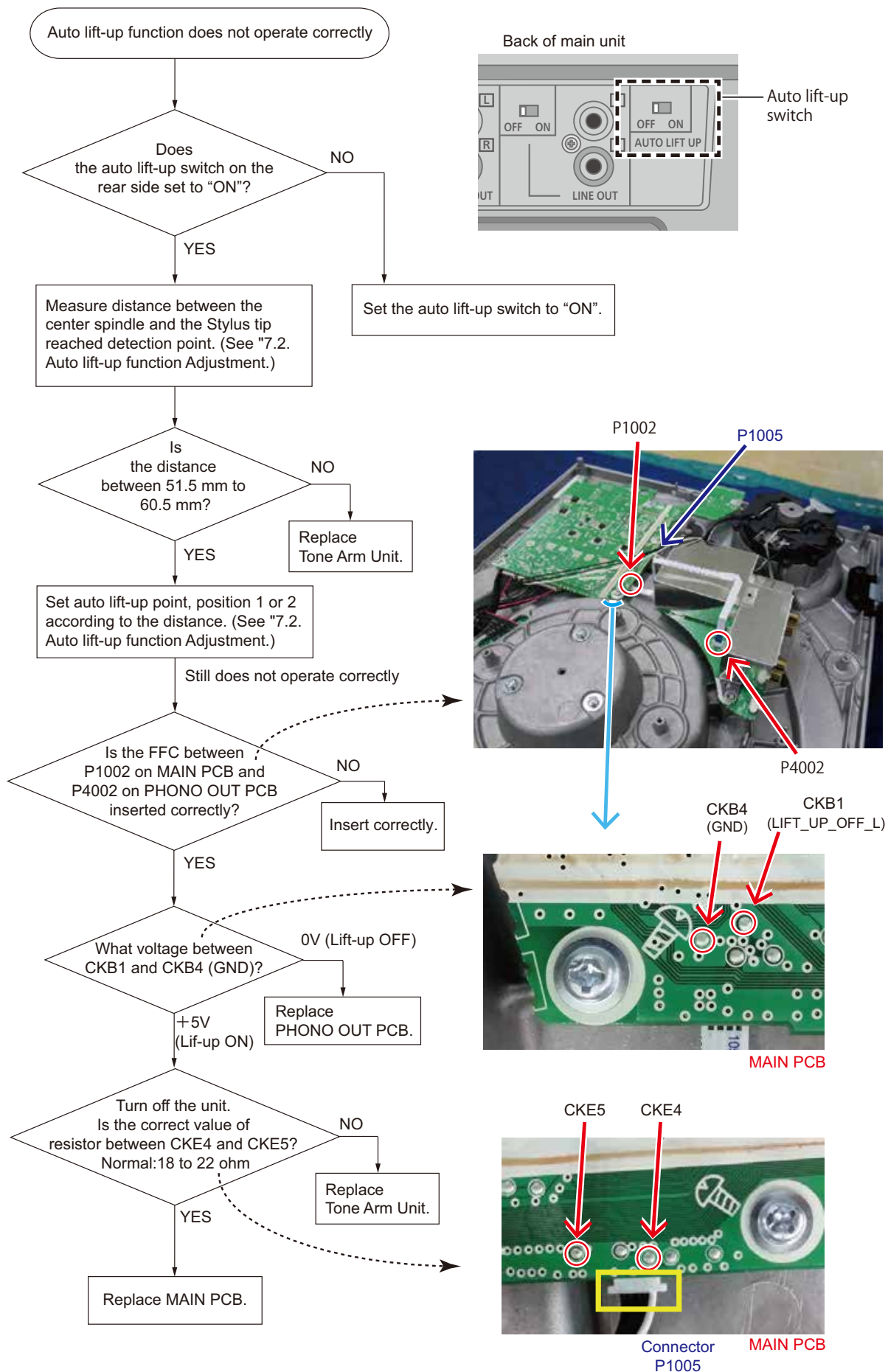
5.5.1. LEDs for speed select buttons (both [33] and [45]) --- No Illumination



5.5.2. LED for speed select button ([33] or [45]) --- No Illumination



5.6. Auto lift-up function does not operate correctly



6 Disassembly and Assembly Instructions

Caution Note:

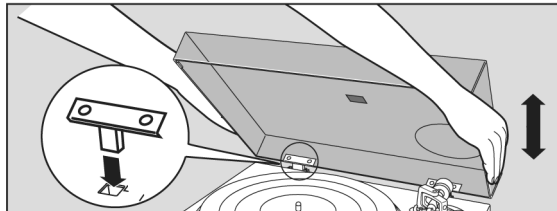
- This section describes the disassembly and/or assembly procedures for all major printed circuit boards & main components for the unit. (You may refer to the section of “Main components and P.C.B Locations” as described in the service manual)
- Before carrying out the disassembly process, please ensure all the safety precautions & procedures are followed.
- During the disassembly and/or assembly process, please handle with care as there may be chassis components with sharp edges.
- Avoid touching heatsinks due to its high temperature after prolong use. (See caution as described below)

**CAUTION: HOT!!
PLEASE DO NOT
TOUCH THE HEAT SINK**

- During disassembly and assembly, please ensure proper service tools, equipments or jigs is being used.
- During replacement of component parts, please refer to the section of “Replacement Parts List” as described in the service manual.
- Select items from the following indexes when disassembly or replacement are required.
- Disassembly of T/T Rubber Mat and Turntable Ass'y
- Disassembly of Insulator Unit
- Disassembly of Bottom Chassis Ass'y
- Disassembly of DC Motors
- Disassembly of Phono Out P.C.B.
- Disassembly of Tone Arm All Unit Ass'y, Queuing Knob and Armrest Ass'y
- Disassembly of Main P.C.B.
- Disassembly of SMPS P.C.B.
- Disassembly of Panel P.C.B.

■ Note when removing the dust cover unit

- Keep it open and lift it straight above..

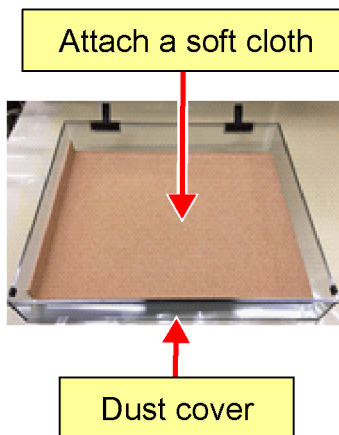
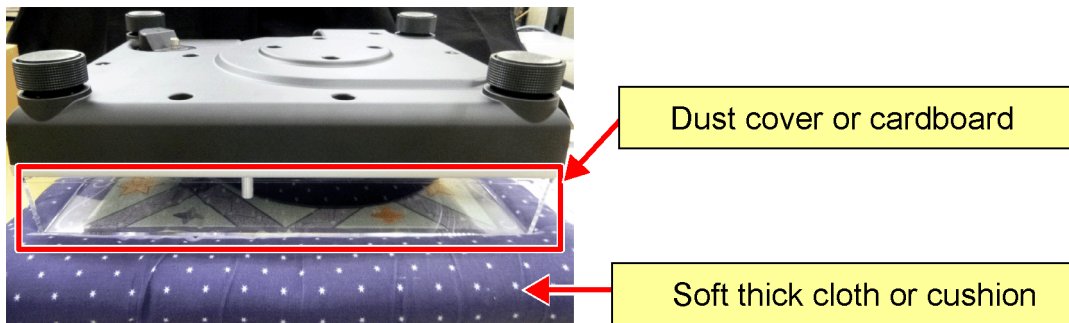


Attention

- Return the tone arm to the arm rest and fix it with the arm clamp before you attach or detach the dust cover.
- Remove the dust cover while playing.
- Be sure the stylus light is pressed down when attaching the dust cover. If the dust cover is attached with the stylus light raised, it may touch the dust cover.

■ Note for assembly and disassembly

- Replace the PCB, etc. from the bottom cover side.
- When turning the unit over, be sure to close the dust cover or put a cardboard as a base, and place the unit on a soft thick cloth or cushion, etc, to prevent cracking.
- When removing the DC Motors and tone arm unit, be sure to attach a soft cloth inside the dust cover beforehand to prevent cracking.



6.1. Types of Screws

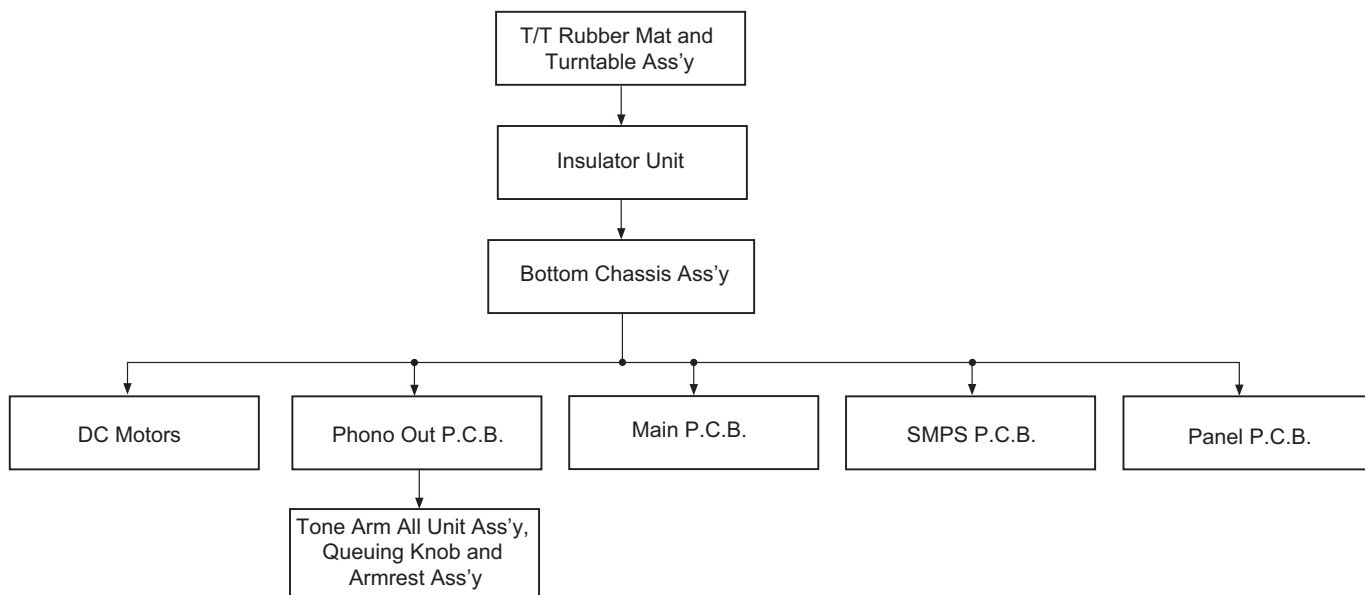
CAUTION NOTE:

Please use original screw and at correct locations.

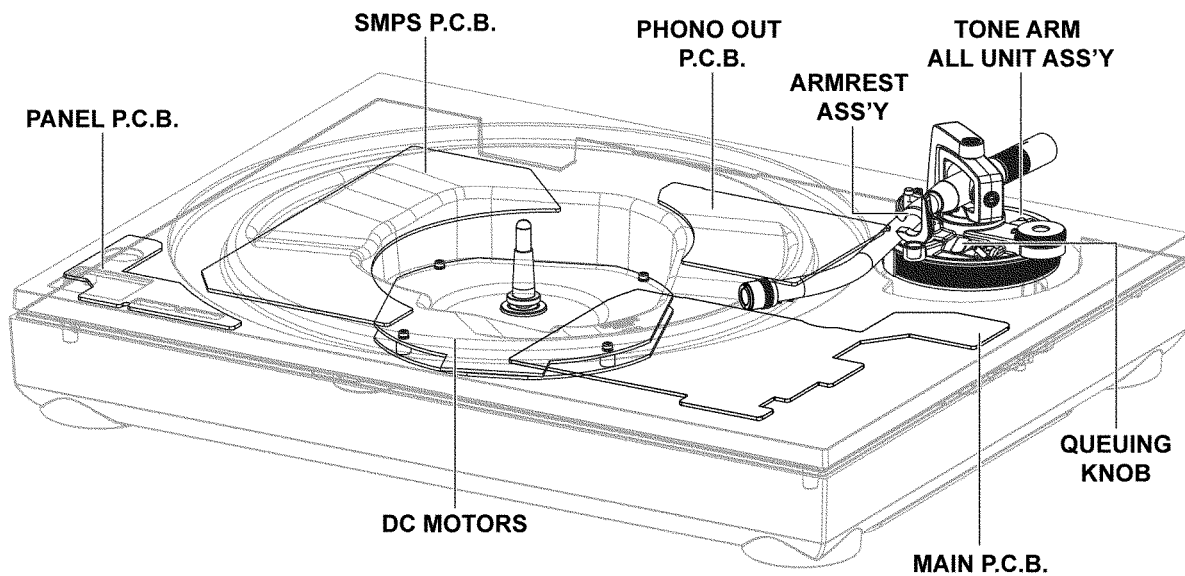
Below shown is part no. of different screw types used:

- | | |
|----------------------|-----------------------|
| a :THTF021J | e :RHD30111-31 |
| b :RHD30248 | f :XTW26+6SFJ |
| c :XTB3+8JFJK | g :TZSM04009 |
| d :XTB3+8JFJ | h :XYN3+C8FJK |

6.2. Disassembly Flow Chart



6.3. Main Components and P.C.B. Locations

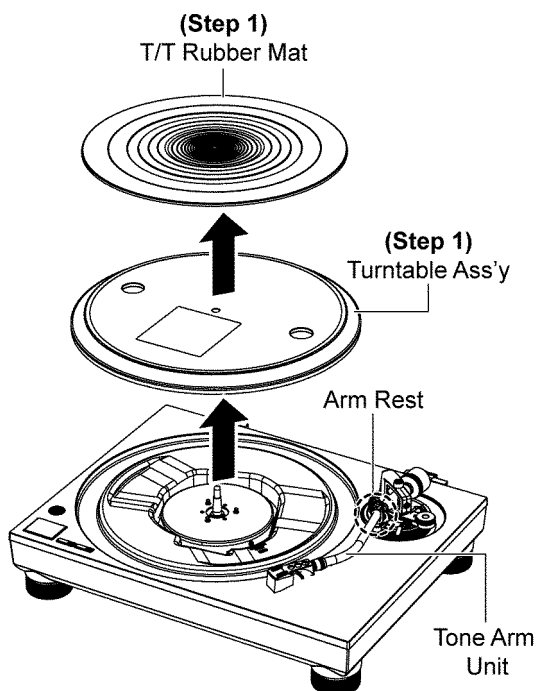


6.4. Disassembly of T/T Rubber Mat and Turntable Ass'y

Step 1 Remove T/T Rubber Mat and Turntable Ass'y as arrow shown.

Note:

- The Tone Arm Unit should be supported by Arm Rest.
- Take care not to stick the dust or iron powder to the magnet attached to back inner side of turntable.



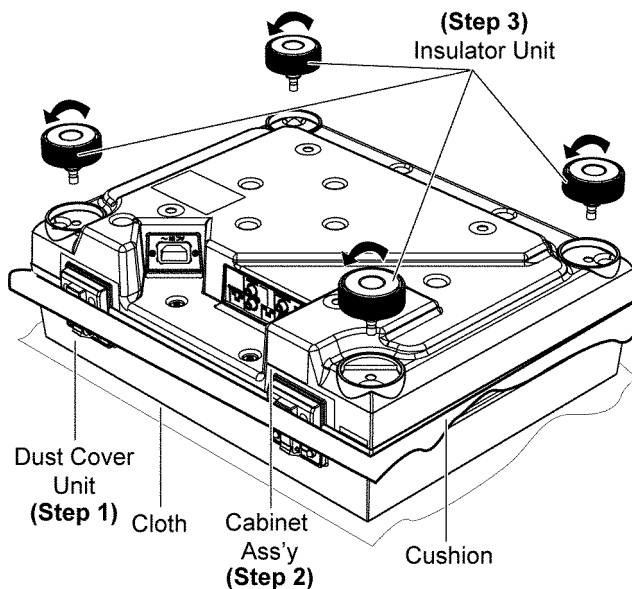
6.5. Disassembly of Insulator Unit

- Refer to "Disassembly of T/T Rubber Mat and Turntable Ass'y".

Step 1 Place the Dust Cover Unit on Cloth.

Step 2 Flip Cabinet Ass'y and put it on Cushion to prevent scratch.

Step 3 Turn the 4 Insulator Unit in the direction of arrow and remove them.

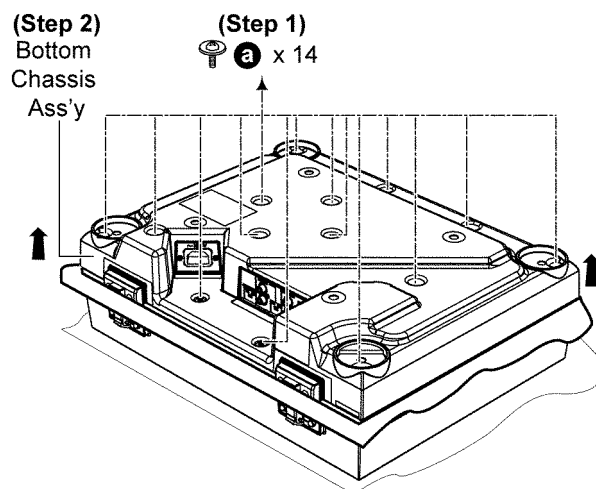


6.6. Disassembly of Bottom Chassis Ass'y

- Refer to "Disassembly of T/T Rubber Mat and Turntable Ass'y".
- Refer to "Disassembly of Insulator Unit".

Step 1 Remove 14 screws.

Step 2 Remove Bottom Chassis Ass'y as arrow shown.



6.7. Disassembly of DC Motors

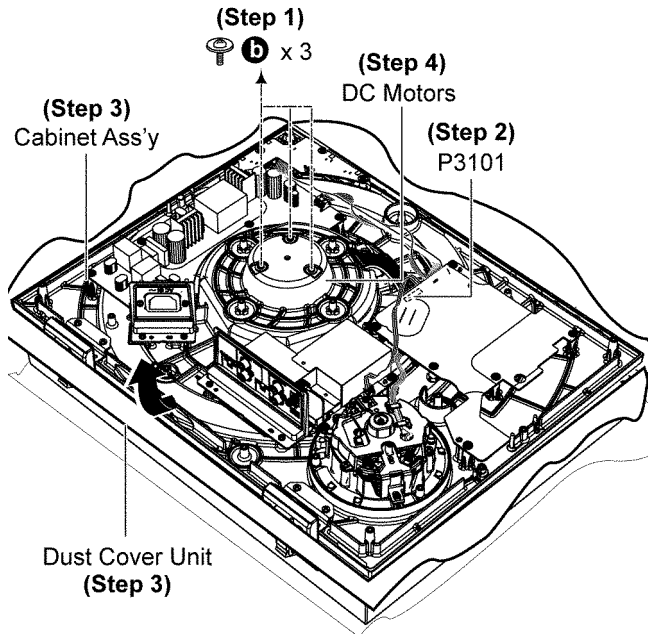
- Refer to “Disassembly of T/T Rubber Mat and Turntable Ass’y”.
- Refer to “Disassembly of Insulator Unit”.
- Refer to “Disassembly of Bottom Chassis Ass’y”.

Step 1 Remove 3 screws.

Step 2 Detach 11P Wire at connector (P3101) on Main P.C.B..

Step 3 Separate the Cabinet Ass’y from the Dust Cover Unit.

Step 4 Remove the DC Motors.



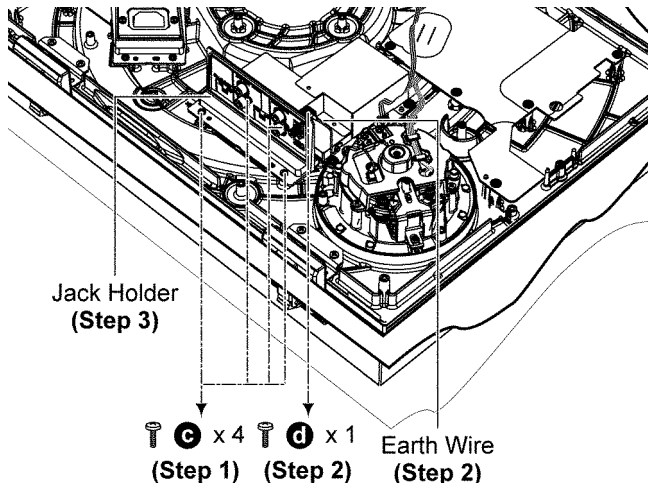
6.8. Disassembly of Phono Out P.C.B.

- Refer to “Disassembly of T/T Rubber Mat and Turntable Ass’y”.
- Refer to “Disassembly of Insulator Unit”.
- Refer to “Disassembly of Bottom Chassis Ass’y”.

Step 1 Remove 4 screws.

Step 2 Remove screw and Earth Wire.

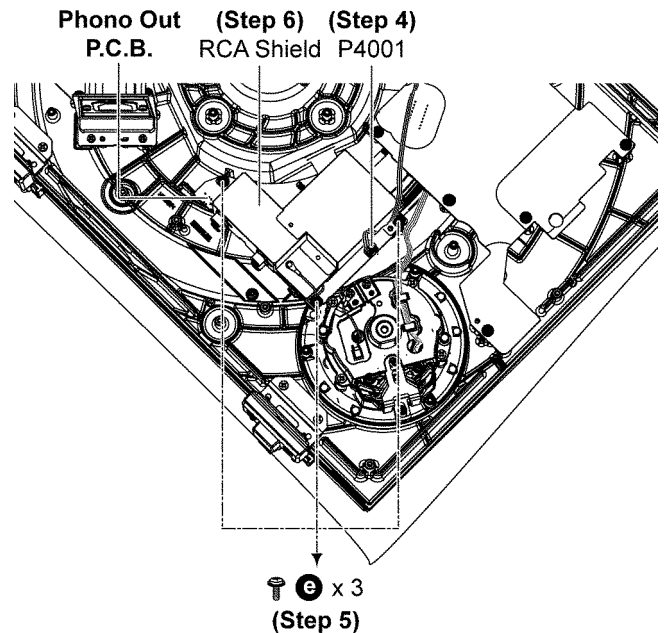
Step 3 Remove Jack Holder.



Step 4 Detach 3P Wire at connector (P4001) on Phono Out P.C.B..

Step 5 Remove 3 screws.

Step 6 Remove RCA Shield.

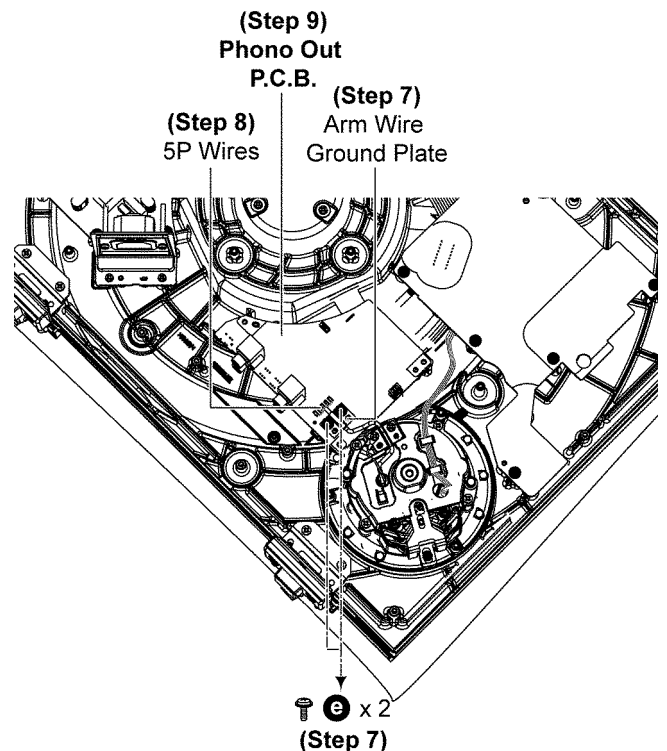


Step 7 Remove 2 screws and Arm Wire Ground Plate.

Step 8 Unsolder 5P Wires on Phono Out P.C.B..

Step 9 Remove Phono Out P.C.B..

Caution: During assembling of 5P Wires, ensure wires properly seated on top of arm wire cushion.



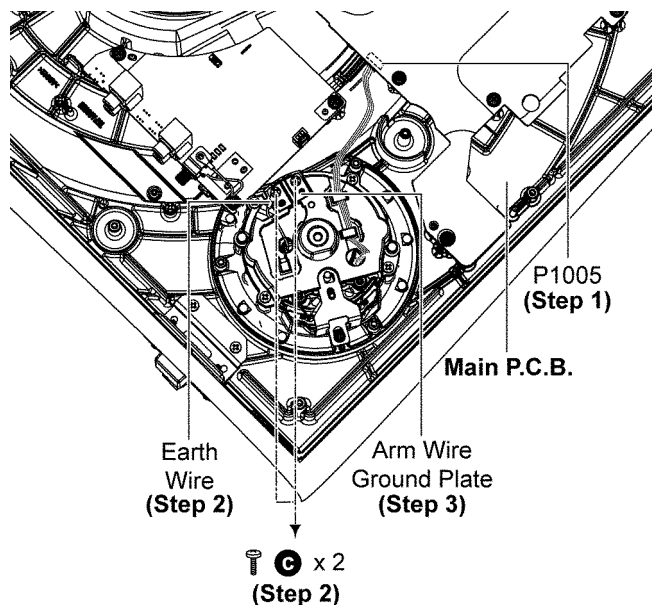
6.9. Disassembly of Tone Arm All Unit Ass'y, Queuing Knob and Armrest Ass'y

- Refer to "Disassembly of T/T Rubber Mat and Turntable Ass'y".
- Refer to "Disassembly of Insulator Unit".
- Refer to "Disassembly of Bottom Chassis Ass'y".
- Refer to "Disassembly of Phono Out P.C.B.". (Step 1 - 8).

Step 1 Detach 5P Wire at connector (P1005) on Main P.C.B..

Step 2 Remove 2 screws and Earth Wire.

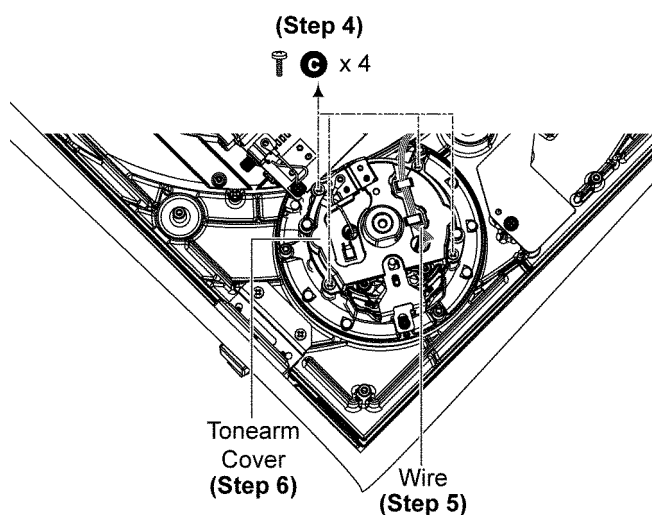
Step 3 Remove Arm Wire Ground Plate.



Step 4 Remove 4 screws.

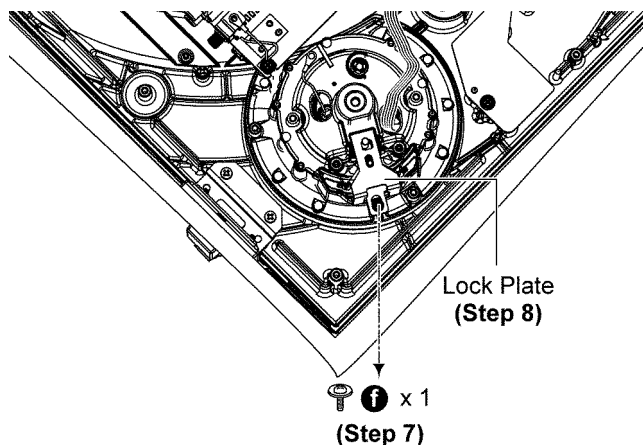
Step 5 Remove Wire.

Step 6 Remove Tonearm Cover.



Step 7 Remove screw.

Step 8 Remove Lock Plate.



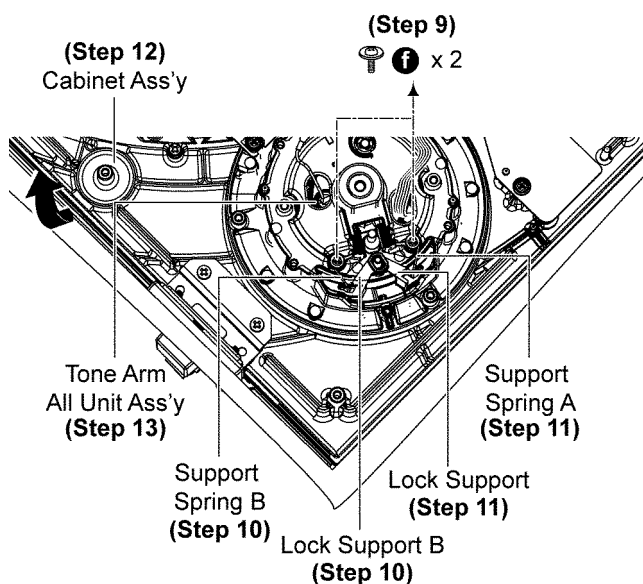
Step 9 Remove 2 screws.

Step 10 Remove Support Spring B and Lock Support B.

Step 11 Remove Support Spring A and Lock Support.

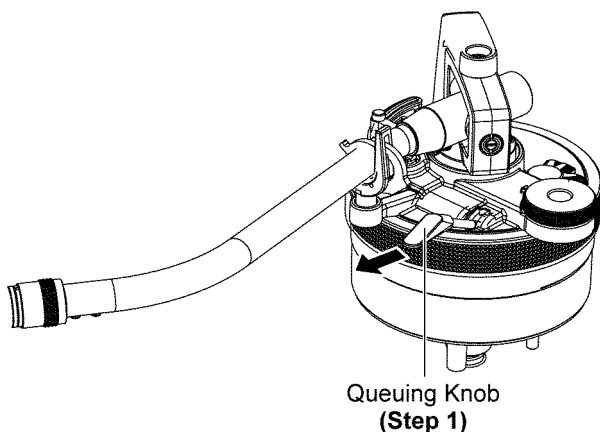
Step 12 Separate the Cabinet Ass'y from the Dust Cover Unit.

Step 13 Remove Tone Arm All Unit Ass'y.



6.9.1. Removing the Queuing Knob

Step 1 Remove the Queuing Knob as arrow shown.

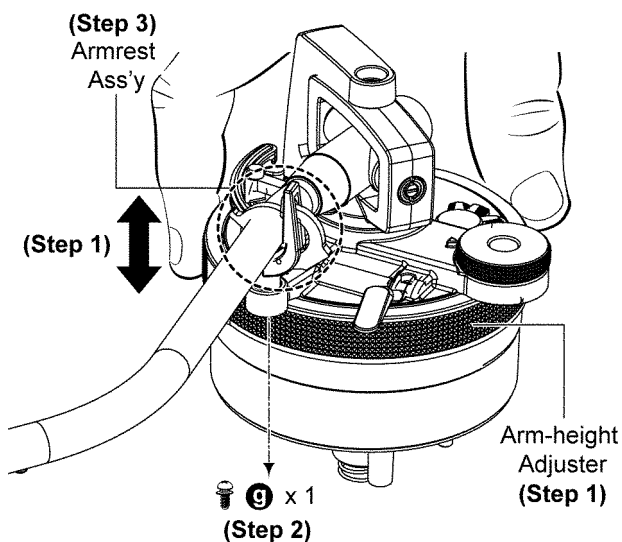


6.9.2. Removing the Armrest Ass'y

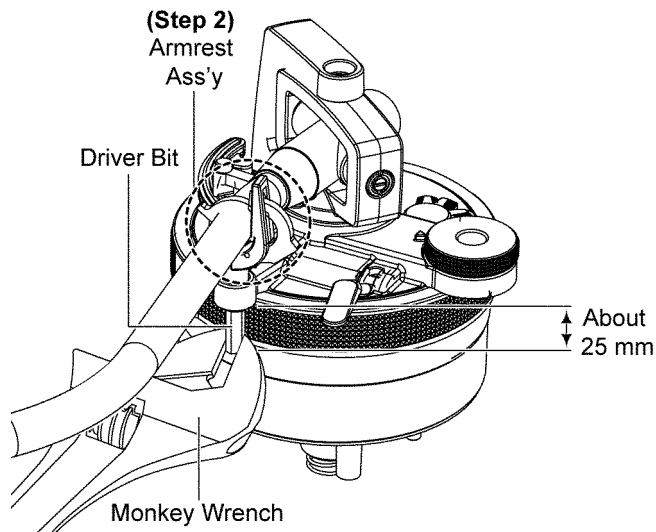
Step 1 Hold the Arm-height Adjuster to lift up to 6 mm.

Step 2 Remove screw.

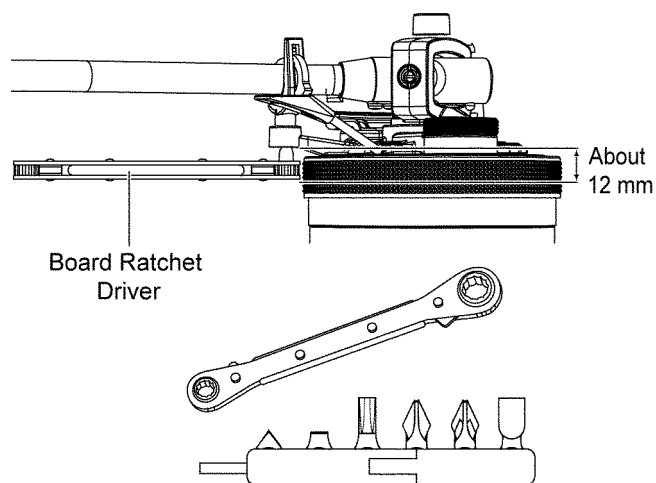
Step 3 Remove Armrest Ass'y.



Note: When attaching and removing the Armrest Ass'y, use a Driver Bit (No. 2) or small type of Monkey Wrench, etc. to remove the screw because of the narrow gap (max 25 mm) of the fixing screw part of the Armrest Ass'y. Do the same when attaching.



Note: When using a commercially sold Board Ratchet Driver, use a driver suitable for working in the gap of 25 mm.



6.10. Disassembly of Main P.C.B.

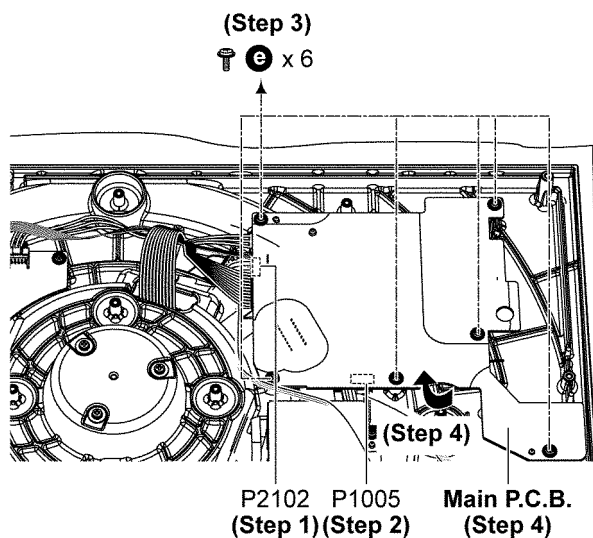
- Refer to “Disassembly of T/T Rubber Mat and Turntable Ass’y”.
- Refer to “Disassembly of Insulator Unit”.
- Refer to “Disassembly of Bottom Chassis Ass’y”.

Step 1 Detach 3P Wire at connector (P2102) on Main P.C.B..

Step 2 Detach 5P Wire at connector (P1005) on Main P.C.B..

Step 3 Remove 6 screws.

Step 4 Flip Main P.C.B..



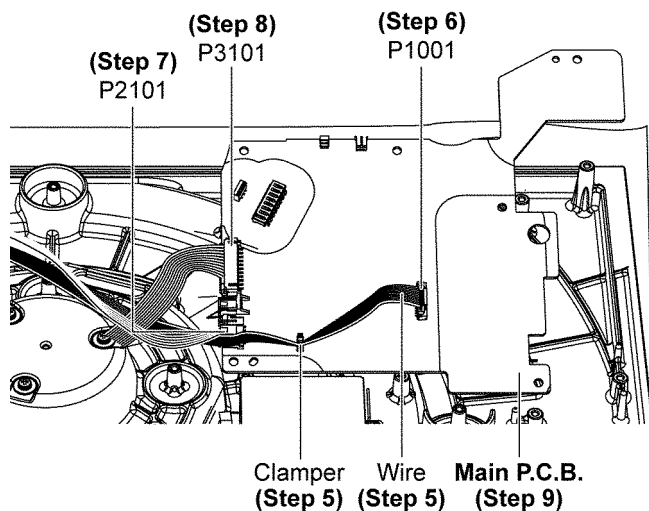
Step 5 Remove Wire from Clamper.

Step 6 Detach 11P Wire at connector (P1001) on Main P.C.B..

Step 7 Detach 5P Wire at connector (P2101) on Main P.C.B..

Step 8 Detach 11P Wire at connector (P3101) on Main P.C.B..

Step 9 Remove Main P.C.B..



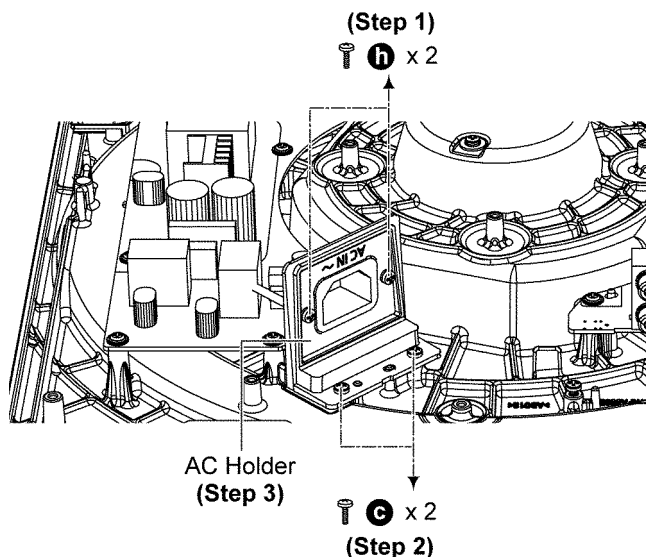
6.11. Disassembly of SMPS P.C.B.

- Refer to “Disassembly of T/T Rubber Mat and Turntable Ass’y”.
- Refer to “Disassembly of Insulator Unit”.
- Refer to “Disassembly of Bottom Chassis Ass’y”.

Step 1 Remove 2 screws.

Step 2 Remove 2 screws.

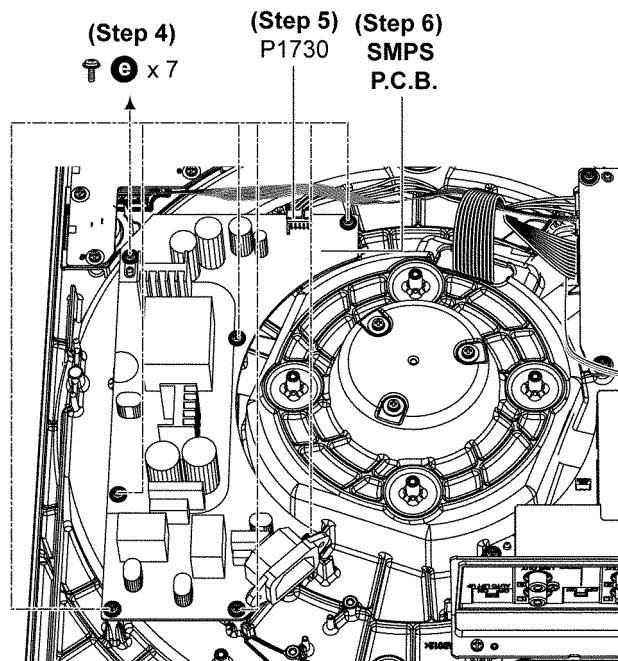
Step 3 Remove AC Holder.



Step 4 Remove 7 screws.

Step 5 Detach 5P Wire at connector (P1730) on SMPS P.C.B..

Step 6 Remove SMPS P.C.B..



6.12. Disassembly of Panel P.C.B.

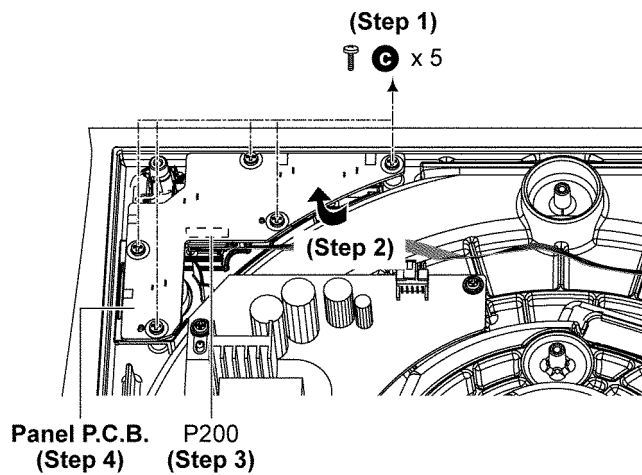
- Refer to “Disassembly of T/T Rubber Mat and Turntable Ass’y”.
- Refer to “Disassembly of Insulator Unit”.
- Refer to “Disassembly of Bottom Chassis Ass’y”.

Step 1 Remove 5 screws.

Step 2 Lift up the Panel P.C.B..

Step 3 Detach 11P Wire at connector (P200) on Panel P.C.B..

Step 4 Remove Panel P.C.B..



7 Measurements and Adjustments

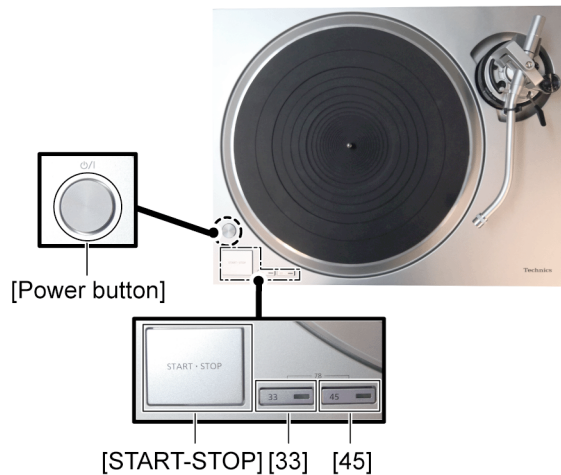
Use the Service Mode to adjust this unit (Auto lift-up function Adjustment and Automatic Adjustment).

- Auto lift-up function Adjustment:
Perform this adjustment when TONE ARM UNIT, MAIN PCB or MOTOR is replaced.
- Automatic Adjustment:
Perform this adjustment when the DC Motor Unit or MAIN PCB is replaced.

7.1. Service Mode Startup Procedure

<Service Mode Startup Procedure>

1. While holding down [Start-Stop] button, turn [ON/OFF(power)] switch to turn the unit, and then press Speed select button [33], [33], [45], [45], [33], [33] in turn.
2. Release [Start-Stop] button.



<Service Mode Startup Check>

- If [45] LED flashes, the Service Mode has started up.



<How to finish the Service Mode>

- Turn the power "OFF" with [POWER SW], or pull out the AC cord.

7.2. Auto lift-up function Adjustment

This function automatically lifts up the tone arm after a record finishes playing. It prevents the last groove from playing back repeatedly.

Perform this adjustment when TONE ARM UNIT, MAIN PCB or MOTOR is replaced.

Measure a detection point of the record end and then set auto lift-up point according to the detection point.

<Status Check before Adjustment>

- Check if the unit is in the following conditions.

Item	Condition
Turntable Unit	Attached to the main unit
T/T Rubber Mat	Attached to the main unit
Record	Not present
Tone Arm	Not fixed to the arm rest
Cue lever	Lift the cue lever and move the tone arm over the Turntable sheet.
Auto lift-up switch	With the unit turned off, set the auto lift-up switch on the rear side to "ON".

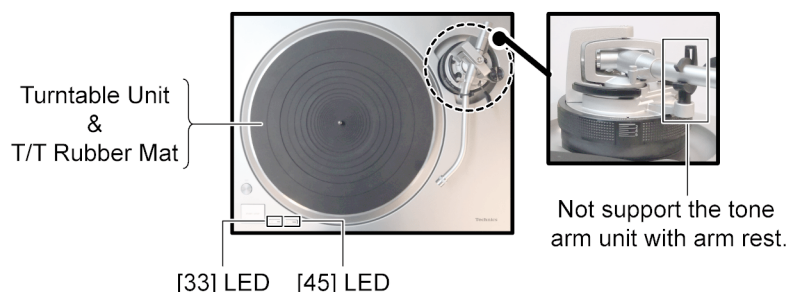
<Overall procedure>

1. Start up the Service Mode.
2. Go into Auto lift-up function Adjustment mode.
3. Measurement of a detection point of the record end.
4. Set auto lift-up point according to the detection point.
5. Exit the Adjustment Mode and Service Mode.

<Adjustment Procedure>

1. Start up the Service Mode. (See "7.1. Service Mode Startup Procedure".)
 - At startup of the Service Mode, check the following conditions.

Item	Condition
LED of Speed select button [45]	Flashing



2. Go into Auto lift-up function Adjustment mode.

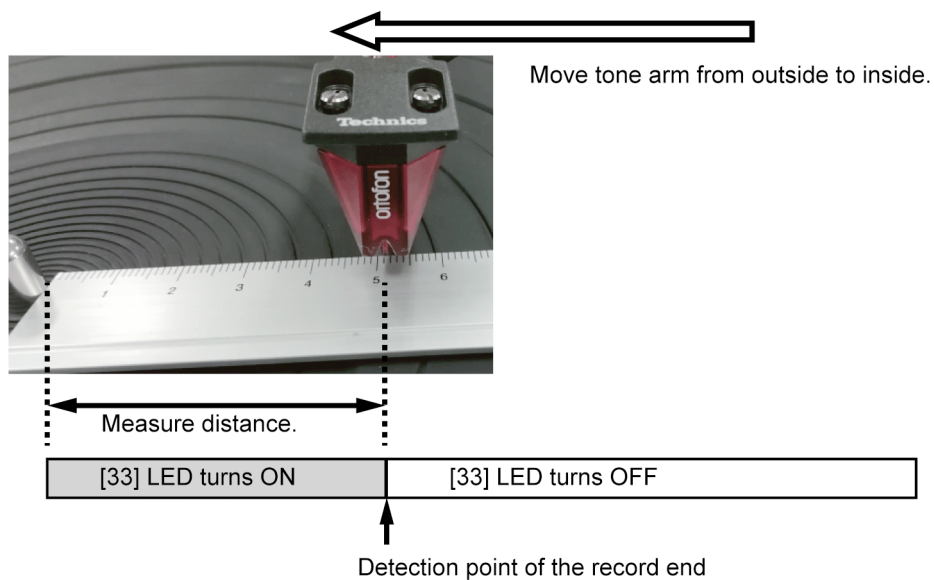
Press and hold the Speed select button [45] for 3 seconds or more.

During in Auto lift-up function Adjustment mode, LED of Speed select button [45] is flashing as 1 sec. period Duty 50%. (500ms:ON, 500ms:OFF continuously) (It differs from blinking in service mode.).
3. Measurement of a detection point of the record end.

Move tone arm from outside to inside.

When tone arm reaches a detection point of the record end, LED of Speed select button [33] turns on.

Measure distance between the center spindle and the Stylus tip reached detection point.



4. Set auto lift-up point according to the distance.
 Distance : 51.5 mm to 56.5 mm ---- position 1
 Distance : 57.0 mm to 60.5 mm ---- position 2

To confirm setting 1 or 2,
 press Speed select button [33] briefly. [33]LED flashing shows which position is setting for 3 seconds as follows.

Position 1 : 1 sec. period Duty 50% (500ms:ON, 500ms:OFF --- 3 times)



Position 2 : 2 flashing within 1 second (100ms:ON, 100ms:OFF, 100ms:ON, 700ms:OFF --- 3 times)



To set the position 1 or 2 according to the distance, press and hold the Speed select button [33] for 3 seconds or more.

5. Exit the Adjustment Mode and Service Mode.
 Turn the power "OFF" with [POWER SW], or pull out the AC cord.

7.3. Automatic Adjustment

This adjustment is automatically performed based on the learning function of the microcomputer.
The following items of measurement/adjustment are automatically performed.

- Rotation accuracy (The reference voltage value)
- Start-up time
- FG Wow and flutter
- Stop angle
- Save adjustment data

<Status Check before Adjustment>

- Check if the unit is in the following conditions.

Item	Condition	Remarks
Turntable Unit	Attached to the main unit	
T/T Rubber Mat	Attached to the main unit	
Record	Not present	
Tone Arm	Fixed to the arm rest	



■ Note for adjustment

- Place the unit on a flat vibration-free table, etc. for adjustment.

<Automatic Adjustment Procedure>

1. Start up the Service Mode. (See "7.1. Service Mode Startup Procedure".)
 - At startup of the Service Mode, check the following conditions.

Item	Condition	Remarks
LED of Speed select button [45]	Flashing	

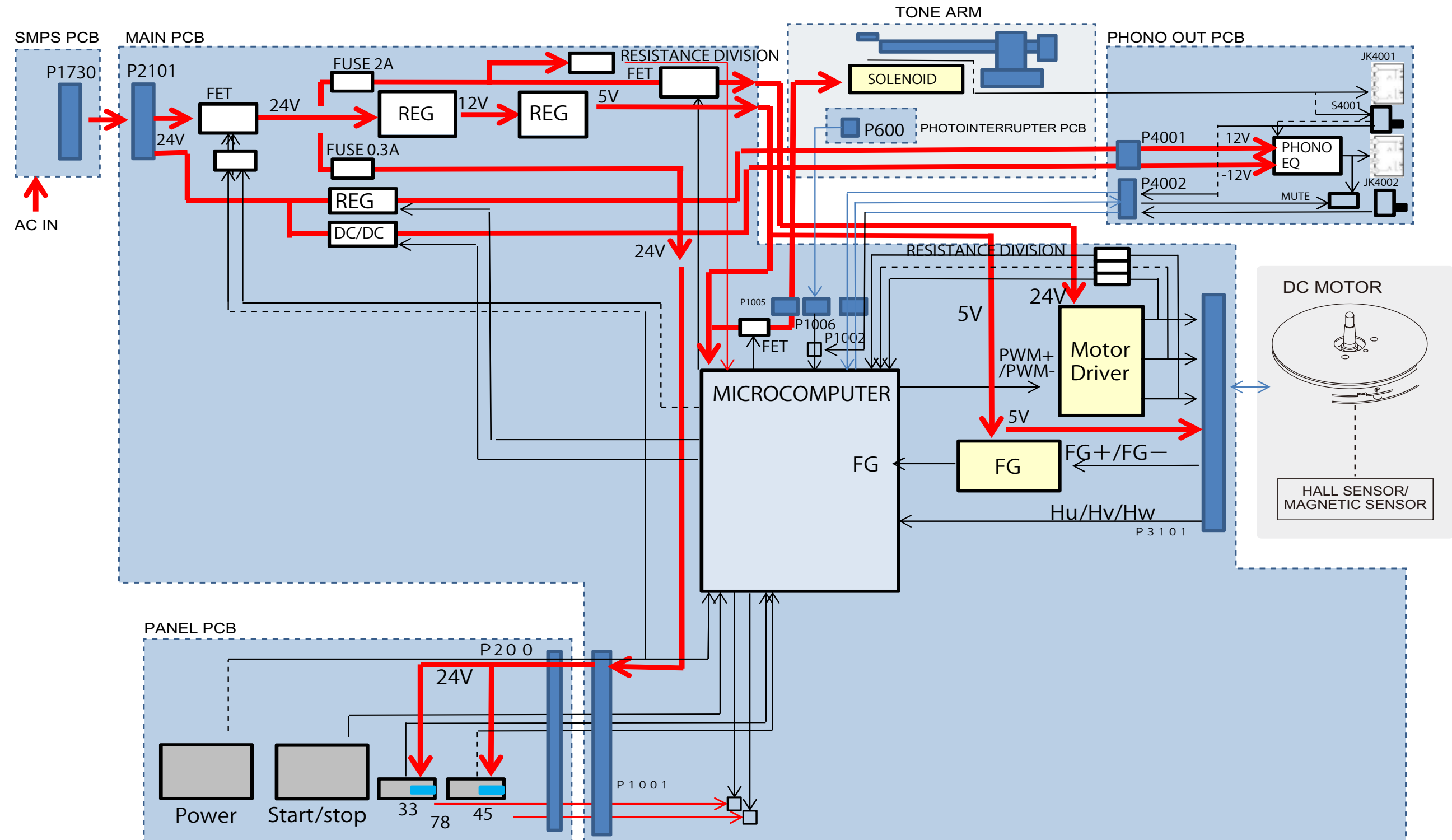


1. Press and hold the [START/STOP] button for 3 seconds or more.
 - Confirm that the turntable rotates, pauses once, and rotates again.
(The adjustment is automatically performed. The LED of the [33] button flashes during adjustment.)
 - The turntable automatically stops when the data is acquired.
(When the LED of the [33] button illuminate, the adjustment is complete. [Adjustment time: approx. 1 minute])

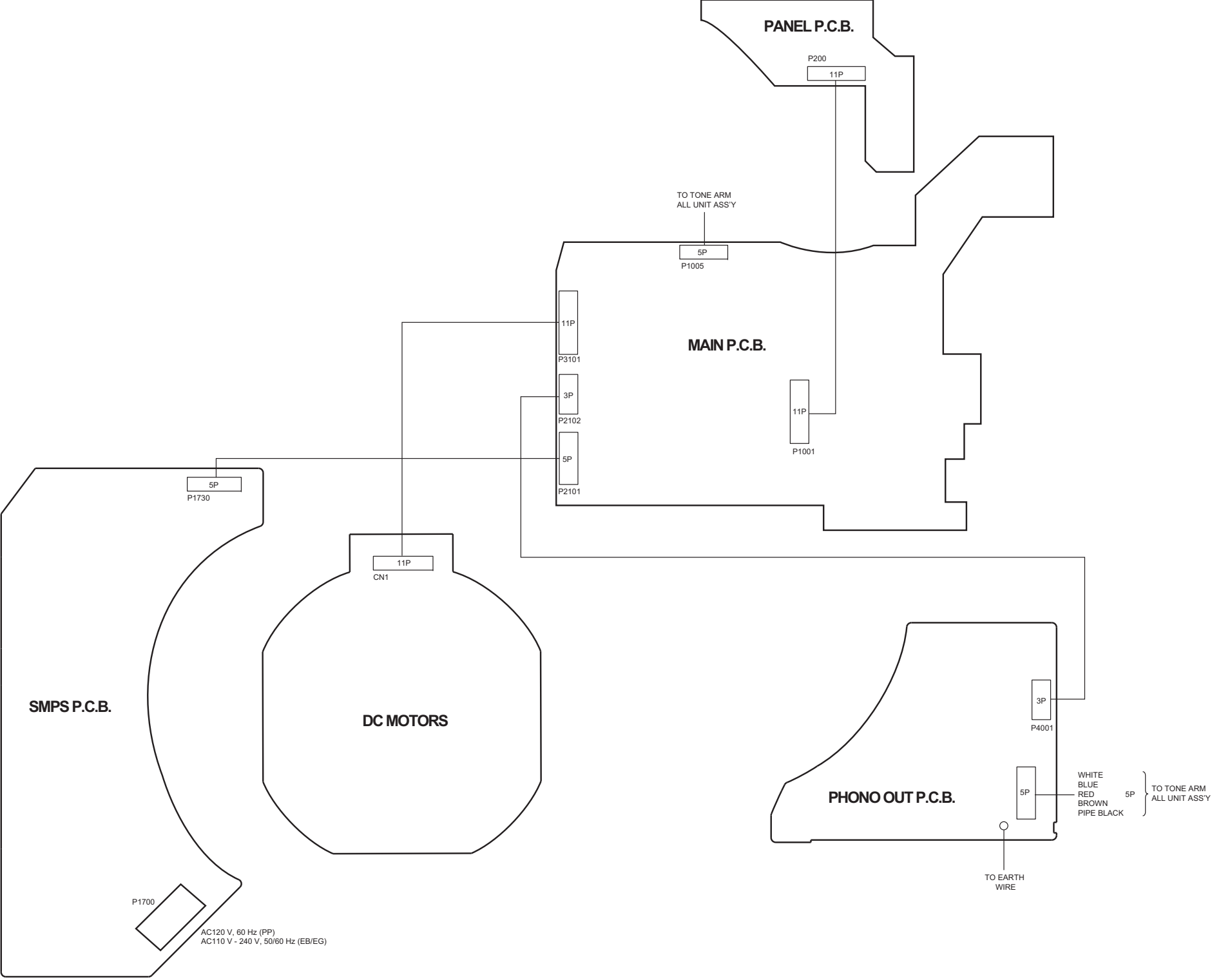
Notes:

- If the LED of the [33] button turns off or flashes, or rotates backward (anticlockwise) even if 2 minutes has elapsed after adjustment, the adjustment is not complete normally. Perform readjustment.
(For readjustment, press and hold the [START/STOP] button again for 3 seconds or more.)
- Do not touch the main unit while rotating.
- Do not press and hold the [45] button for 3 seconds or more in the Service Mode.
(Doing so will erase the result.)

8 Block Diagram



9 Wiring Connection Diagram



SL-1500CEB/EG/PP WIRING CONNECTION DIAGRAM

10 Exploded View and Replacement Parts List

10.1. Electrical Replacement Parts List

Important Safety Notice

Components identified by \triangle mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

RTL (Retention Time Limited)

Note: The marking (RTL) indicates that the Retention Time is Limited for this item.

After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependant on the type of assembly, and in accordance with the laws governing part and product retention. After the end of this period, the assembly will no longer be available.

Note:

- When replacing any of these components, be sure to use only manufacturer's specified parts shown in the replacement part list.
- The parenthesized indications on the Remarks column specify the destination & product color (Refer to the cover page for the information).
- Parts without these indications shall be used for all areas.
- This product uses a laser diode. Refer to "Precaution of Laser Diode".
- Capacitor value are in microfarads (μ F) unless specified otherwise, P=Pico-farads (pF), F=Farads.
- Resistance values are in ohms, unless specified otherwise, 1K=1000 (OHM).
- All parts mentioned are supplied by PAVCJM unless indicated likewise.
- Parts mentioned [SPG] in the Remarks column are supplied by JAPAN.

E.S.D. standards for Electrostatically Sensitive Devices, refer to "PREVENTION OF ELECTROSTATIC DISCHARGE (ESD) TO ELECTROSTATIC SENSITIVE (ES) DEVICES" section.

Safety	Ref. No.	Part No.	Part Name & Description	Qty	Remarks
			PRINTED CIRCUIT BOARDS		
	PCB1	TNPA7005AB	MAIN P.C.B.	1	
			PRINTED CIRCUIT BOARDS		
	PCB2	TNPA7011AA	PANEL P.C.B.	1	
			PRINTED CIRCUIT BOARDS		
	PCB3	TNPA7014AB	PHONO OUT P.C.B.	1	
			PRINTED CIRCUIT BOARDS		
\triangle	PCB4	TNPA7015AB	SMPS P.C.B.	1	

10.2. Mechanical Replacement Part List

Important Safety Notice

Components identified by Δ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

RTL (Retention Time Limited)

Note: The marking (RTL) indicates that the Retention Time is Limited for this item.

After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependant on the type of assembly, and in accordance with the laws governing part and product retention. After the end of this period, the assembly will no longer be available.

Note:

- When replacing any of these components, be sure to use only manufacturer's specified parts shown in the replacement part list.
- The parenthesized indications on the Remarks column specify the destination & product color (Refer to the cover page for the information).
- Parts without these indications shall be used for all areas.
- This product uses a laser diode. Refer to "Precaution of Laser Diode".
- All parts mentioned are supplied by PAVCJM unless indicated likewise.
- Reference for O/I book languages are as follows:

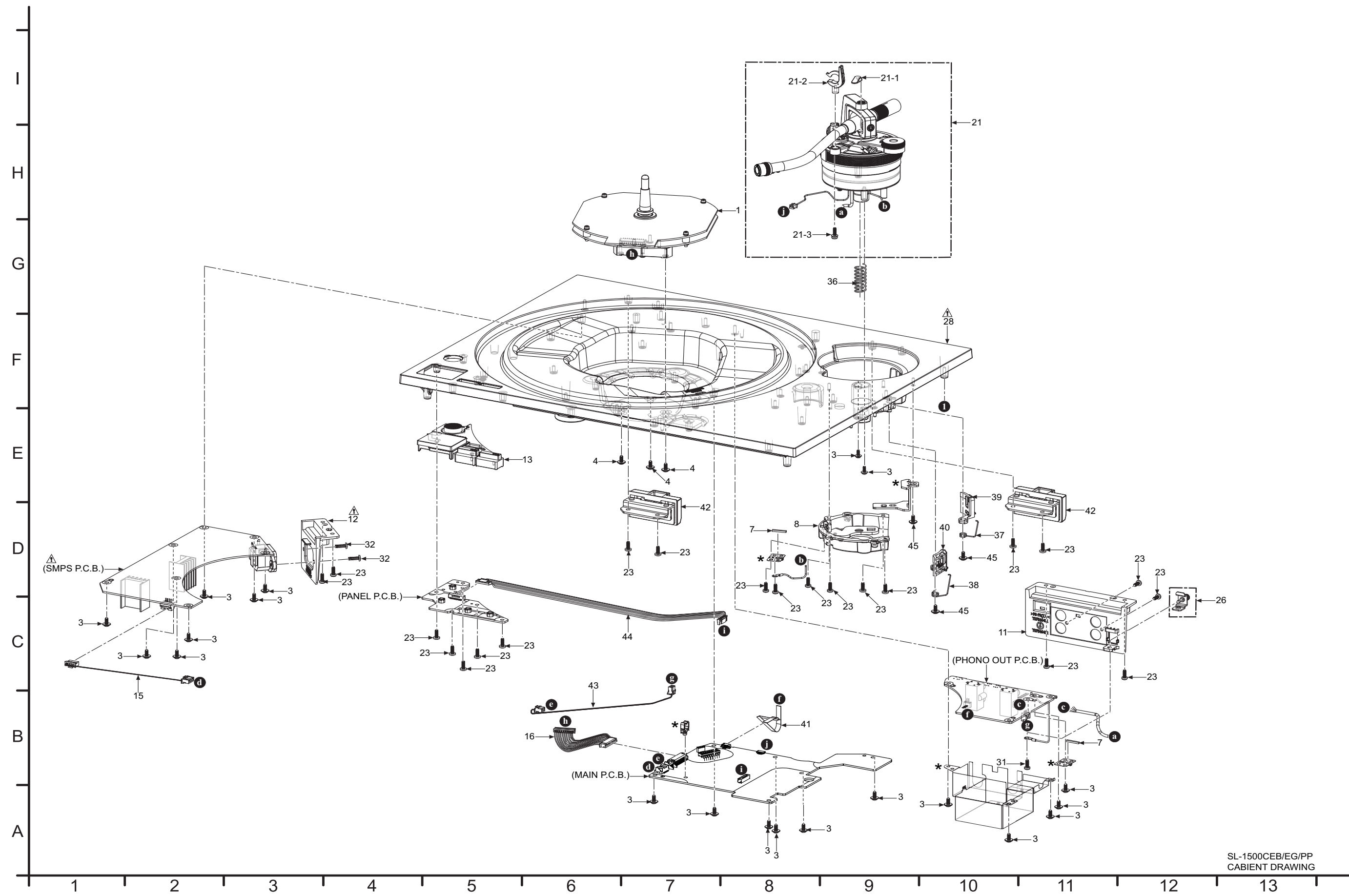
Ar:	Arabic	Du:	Dutch	It:	Italian	Sp:	Spanish
Cf:	Canadian French	En:	English	Ko:	Korean	Sw:	Swedish
Cz:	Czech	Fr:	French	Po:	Polish	Co:	Traditional Chinese
Da:	Danish	Ge:	German	Ru:	Russian	Cn:	Simplified Chinese
Pe:	Persian	Ur:	Ukraine	Pr:	Portuguese	Fi:	Finnish

Safety	Ref. No.	Part No.	Part Name & Description	Qty	Remarks
			CABINET AND CHASSIS		
	1	L6YZYJ000004	DC MOTORS	1	
	3	RHD30111-31	SCREW	20	
	4	RHD30248	SCREW	3	
	7	TEFX5020	ARM WIRE CUSHION	2	
	8	TEKX119	TONEARM COVER	1	
	9	THTF021J	SPECIAL SCREW	25	
	11	TKFE46402	JACK HOLDER	1	
Δ	12	TKFE46501	AC HOLDER	1	
	13	TTD0014	OPERATION UNIT	1	EB-K EG-K
	13	TTD0011	OPERATION UNIT	1	EG-S PP-S EB-S
	15	TXJ/05BC5E	5PIN WIRE (SMPS-MAIN)	1	
	16	TXJ/11BC5E	11PIN WIRE (MOTOR -MAIN)	1	
	21	TZTYL01BE7E	TONE ARM ALL UNIT ASS'Y	1	EB-K EG-K
	21	TZTYL01BC4E	TONE ARM ALL UNIT ASS'Y	1	EG-S PP-S EB-S
	21-1	RMH0241-K1	QUEUEING KNOB	1	
	21-2	RYQ1630-K1	ARMREST ASSY	1	
	21-3	TZSM04009	ARM REST SCREW KIT	1	
	22	TYL0296	INSULATOR UNIT	4	
	23	XTB3+8JFJK	SCREW	21	

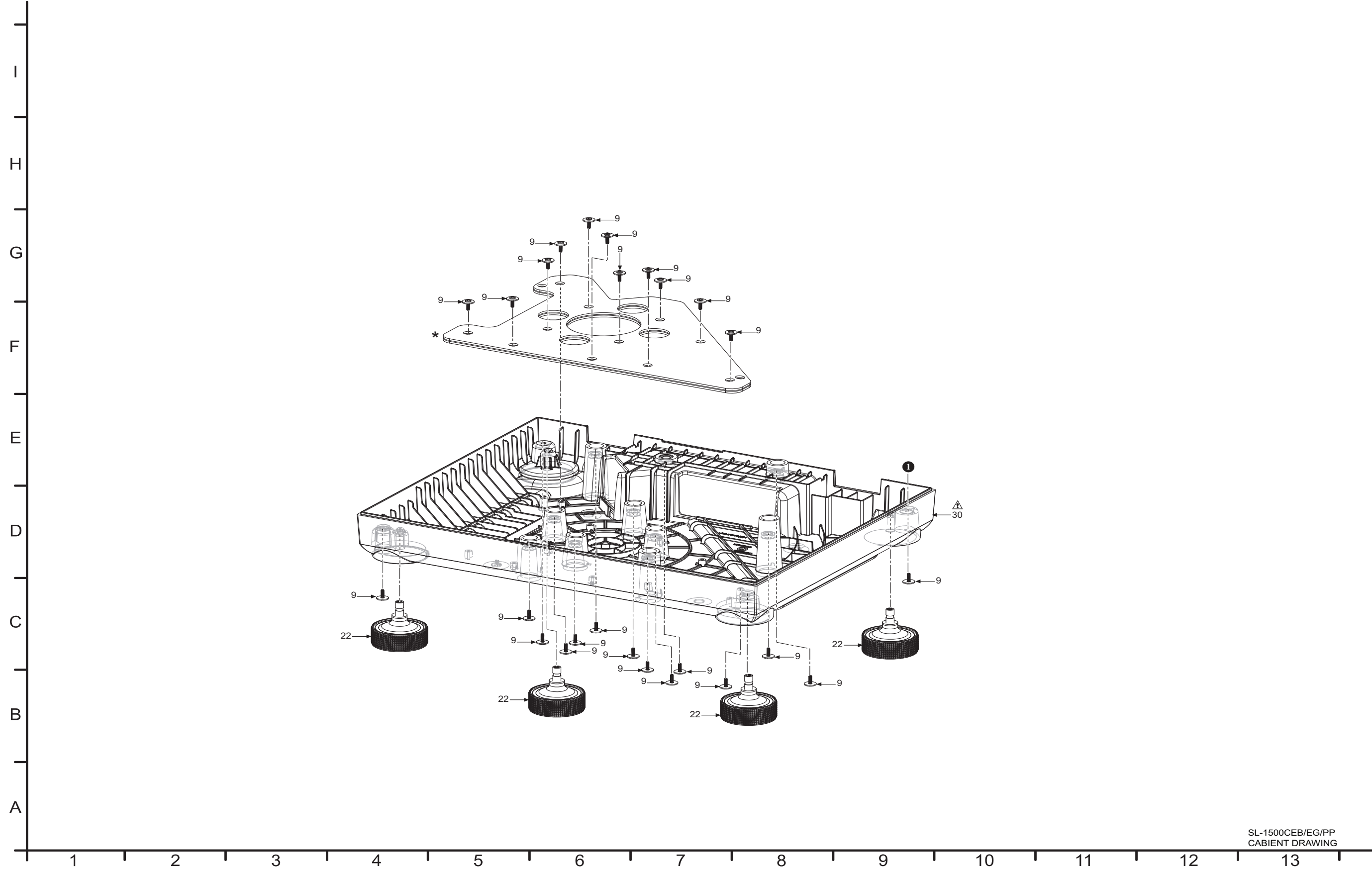
Safety	Ref. No.	Part No.	Part Name & Description	Qty	Remarks
	26	TZTKF01BC3E	GROUND PLATE WITH TERMINAL	1	
Δ	28	TZTKF02BE7E	TOP PANEL ASS'Y (BLACK)	1	EB-K EG-K
Δ	28	TZTKF01BC2E	TOP PANEL ASS'Y (SILVER)	1	EG-S PP-S EB-S
Δ	30	TZTKF01BE7E	BOTTOM CABINET ASS'Y	1	EB-K EG-K EG-S EB-S
Δ	30	TZTKF01AH8U	BOTTOM CABINET ASS'Y	1	PP-S
	31	XTB3+8JFJ	SCREW	1	
	32	XYN3+C8FJK	SCREW	2	
	36	TESD162	CENTER SHAFT SPRING	1	
	37	TESD167	SUPPORT SPRING A	1	
	38	TESD168	SUPPORT SPRING B	1	
	39	TKKH51381	LOCK SUPPORT	1	
	40	TKKH51451	LOCK SUPPORT B	1	
	41	TSXM548	4PIN WIRE (MAIN - PHONO OUT)	1	
	42	TTD0015	HINGE PLATE UNIT	2	
	43	TXJ//3BE8E	3PIN WIRE (MAIN - PHONO OUT)	1	
	44	TXJ/11BE8E	11PIN WIRE (MAIN - PANEL)	1	
	45	XTW26+6SFJ	SCREW	3	
			PACKING MATERIALS		
	P1	TPCE30701	PACKING CASE	1	EB-K
	P1	TPCE30401	PACKING CASE	1	EG-S

Safety	Ref. No.	Part No.	Part Name & Description	Qty	Remarks
	P1	TPCE30501	PACKING CASE	1	EG-K
	P1	TPCE30801	PACKING CASE	1	PP-S
	P1	TPCE30601	PACKING CASE	1	EB-S
	P2	TPDA34201	TOP CUSHION	1	
	P3	TPEH964-1	PE BAG (450X550MM)	1	
	P4	TPEH965-1	PE BAG (600X600MM)	1	
	P5	TPEH966	PROTECTION SHEET (450X750MM)	1	
	P6	TPEH980	PE BAG (MIRAMAT 600X500)	1	
	P7	TPH0284	CUSHION UNIT	1	
	P8	TPDA34211	PICK UP CUSHION	1	
			ACCESSORIES		
⚠	A1	K2CT3YY00096	AC CORD	1	EB-K EB-S
⚠	A1	K2CG3YY00219	AC CORD	1	PP-S
⚠	A1	K2CM3YY00055	AC CORD	1	EG-S EG-K
⚠	A2	TQBM0414	OI (En)	1	EB-K EB-S
⚠	A2	TQBM0413	OI (En/Ge/Fr/It/Sp/Da/Du/Sw/Fi/Po)	1	EG-K EG-S
⚠	A2	TQBM0415	OI (En/Cf)	1	PP-S
	A3	TAQ0036	SIGNAL AND GND CABLE ASSY	1	
	A4	TPH0339	EP ADAPTER UNIT BLACK	1	EB-K EG-K
	A4	TPH0340	EP ADAPTER UNIT SILVER	1	EG-S PP-S EB-S
	A5	TTFA0457	DUST COVER UNIT	1	
	A7	TYL0295	BALANCE WEIGHT ASSY	1	EB-K EG-K
	A7	TYL0361	BALANCE WEIGHT ASSY	1	EG-S PP-S EB-S
	A8	TYL0359	TURNTABLE ASS'Y	1	EB-K EG-K
	A8	TYL0302	TURNTABLE ASS'Y	1	EG-S EB-S
	A8	TYL0375	TURNTABLE ASS'Y	1	PP-S
	A10	TYL0360	SHELL ASSY	1	
	A12	RGS0008	T/T RUBBER MAT	1	
	A13	TYL0362	AUX WEIGHT ASS'Y	1	

10.3. Cabinet Parts Location 1



10.4. Cabinet Parts Location 2



SL-1500CEB/EG/PP
CABINET DRAWING

10.5. Packaging

